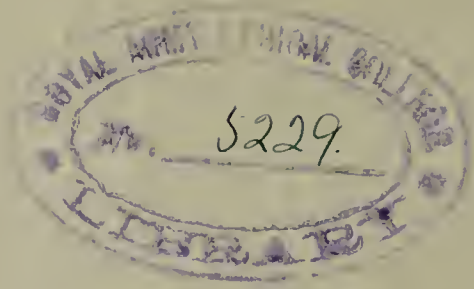


BIOLOGICAL
FLAPS

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BIOLOGICAL- OR ARTERY FLAPS OF THE FACE

WITH 420 PLATES

and a List of the Author's Publications

by

J. F. S. ESSER

Who was the first to specialize in « Structive » or « Plastic » Surgery of the whole body,
Physician of LEIDEN University,

Belgian M. D. of GHENT University,

Nominated German M. D. of BERLIN University,

The first Consulting-Surgeon for Plastic Surgery of the Ministeries of War of AUSTRIA-
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Surgeon-in-Chief of the Great Austrian War Hospital of BRÜNN (Moravia),

Special Plastic Surgeon of :

The Imperial & Royal Reserve Hospital in Vienna at :

No. 8 (Central Hospital for Face Injuries) and

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Hofrat Prof. Hochenegg's University Surgical Clinic, VIENNA.

Special Plastic Surgeon of :

Prof. Verebely's University Clinic of Surgery, BUDAPEST,

Prof. Omodi's University Clinic for the Ear, Nose and Throat,

The Imperial & Royal Reserve Hospital for Amputations,

The Reserve Hospital for Noses. (All in BUDAPEST.)

Special Plastic Surgeon of :

The LAZARETT in the Technical University School, BERLIN.

Geheimrat Prof. August Bier's University Surgical Clinic, BERLIN.

Geheimrat Prof. M. Borchardt's Moabiter Clinic, BERLIN.

Geheimrat Prof. E. Krückmann's University EYE Clinic,

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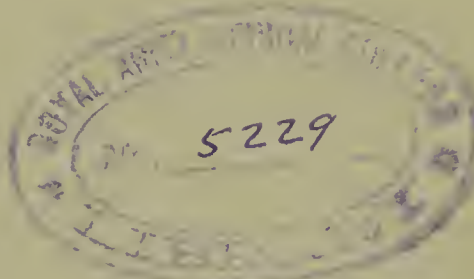
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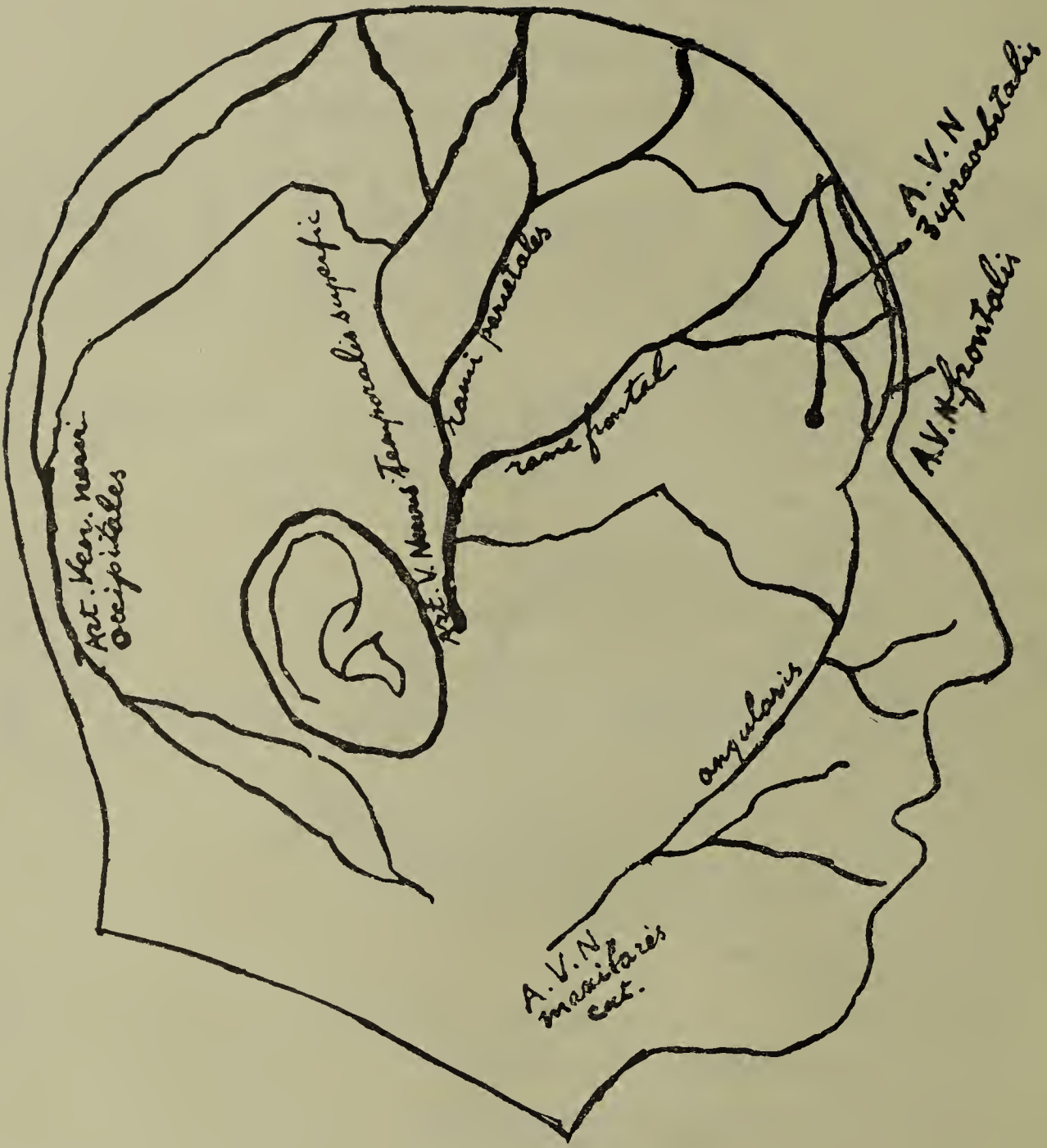
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PREFACE.

I introduced my method of « Biological- or Artery Flaps » in 1915, after my methods the « Epithelial inlay » and the « Rotation of the Cheek ».

It would have been more correct to call it only « Biological Flaps », but I added the name « Artery Flaps » to facilitate the establishing of the place and form of the Flaps, as the veins, lymphvessels and nerves run together with the Artery.

The principle of the « Biological Flaps » or « Artery Flaps » is, that the pedicles are thin, generally short and consist only in veins, arteries, lymphvessels and nerves, surrounded with a small covering or protecting sheet of elastic connective tissue, but have no skin or other tissue. The tissues would bring no advantage, but they could easily close the vessels by pressure, if the pedicles are very much turned.

I introduced the « Biological- or Artery Flaps » in various articles and lectures in Medical societies of Berlin and later in 1922 in the Surgical Congress at Berlin. Formerly the surgeons used the everywhere recommended rule to cut the pedicles at least as broad as one third of the length of the flap.

Dieffenbach went so far as to recommend to cut any artery, if found in the pedicle. This was not right, but his great authority caused, that every one followed and propagated his advice. Surely he must have seen, that flaps often died by overabundance of blood filling. The colour of the flaps grew from red to black, till they died.

He did not observe, that the absence of veins and lymphvessels caused the death, of the flap and not the presence of arteries.

Another mistake was made in a small publication of one operation by Monks, found by one of my assistants some years ago. He was said to have propagated the use of an abnormally long, all over very thin pedicle, which had to contain the artery Temporalis.

The disadvantage was especially dangerous for unexperienced surgeons, because even if, by chance, besides the Artery, the nerves, veins and lymphvessels were conserved in the pedicle, this inclines to fail :

- a) by the difficulty of its technic ;
- b) by the risk of missing interesting elements ;

c) by the risk of obstruction in the vessels by the thrombosing of the branches, all cut near to the main vessel ;

d) the risk of getting overabundance of blood and necrose if veins and lymphvessels are missing.

I should never advise surgeons to generalize the cases with long very thin pedicles, also demonstrated by me, for they must remain exceptional acrobatic cases with great risk.

Their danger is, that the concentration on the artery makes them neglect the greater interest in the veins, lymphvessels and nerves. Besides, these other elements run close to the Artery generally, but now and then deviate to a greater distance and risk being cut.

I therefore advise taking the pedicles not only as thin, but also as short as possible, contrary to the above mentioned advice.

If the flap material must be taken far away from the turning point of the pedicle, it is better to diminish gradually the breadth of the flap to that point, giving the shape of a pear to the flap.

My « Biological- or Artery Flap » have been used many thousand times, in the beginning of the great war, as no official specialists in « Structivè » or « Plastic » surgery existed, besides myself, for treating the whole body.

I had to do at first all the general surgery of perhaps the largest hospital of the world at Brunn, the capital of Moravia, at that time Austria. It had 3600 beds and I was the Surgeon-in-Chief.

Later in Vienna, Budapest and Berlin I worked only as specialist, being Chief Consulting Specialist for Plastic Operations of the whole body of the Ministeries of War of Austria, Hungary and Germany. I performed over 10.000 operations there, using a great number of « Biological- or Artery Flaps », thus I am justified in declaring, that this method has greatly proved its value. I believe it at least as important and useful as my « Epithelial Inlay » which the American press estimated as one of the most valuable results of » Plastic Surgery » during the war.

Once presenting my « Biological- or Artery Flaps » theory and some cases to the Medical Association in Berlin, Prof. Virchow highly praised the biological and anatomical base of the method. I gratefully mention here the great help, I obtained from the Surgeons Bier, Bor-

chardt, Küttner, Hochenegg, Verebely, de Bruïne Groeneveldt, Stolz, Seijberth, Finsterer, Demmer, Dreier, Melchior, Unger, Braun, Williger, Rotter, etc., the Oculists Krückmann, Unthoff, Silex, Weill, Adam, Morax, Mühsam and Krusius, the Rhinologists Onodi and Halle, and the Dentists Weiser, Wunschheim, Riegner, Schröder, Van der Molen, Brill and Liebteig, who enabled me to gain such immense experience chiefly in the « Biological- or Artery Flaps ».

Especially I thank Bier, Krückmann and Schröder, who invited me to Berlin, paying me a salary at their own expense, till I received my nomination as « Fachärztlicher Beirat » (consulting Specialist to the Ministry of War in Berlin) and placing at my disposal a large part of their Clinics.

Bier took considerable interest in my work and in the « Biological- or Artery Flaps », often even assisting me in my operations and consulting me, and ordering some of his Assistants to be, during certain periods, my Assistants.

Bier taught me important views in Biological problems in our many conversations. He offered to establish an Institute for Plastic Surgery in his Clinic, but I could not accept this great honour, as I intended to found an International Institute. I owe to him the broadening of my views, and through him I received invitations from a well known editor to write the book « Rotation der Wange » and from Aberhalden to write a volume on Plastic Surgery in the « Handbuch der biologischen Arbeitsmethoden ». Grateful thanks also to Bier for my nomination as German Surgeon at the Berlin University (Approbation als Arzt) with the right to practise without any examination and the honourable mention « on account of high scientific work ». The more as I was told « only three foreigners have ever received this honour ».

Many thanks are also due to Krückmann for his promise to procure me the title of professor of the Berlin University, which unfortunately we both forgot to claim till we read, after the revolution, that this title was no longer granted.

For many years Krückmann gave me the greatest assistance in developing my methods, my experience and especially my « Biological- or Artery Flaps ».

The Professors Stolz, and Weill of the University of Strasbourg,

Morax, Dufourmentel of Paris and Oidtmann, Pimentel of Amsterdam, Murk Jansen of Leiden and Noordenbos, Boks and Remynse of Rotterdam, Lexer of Germany gave me cases to operate, or interceded in favour of the use of « Biological- or Artery Flaps ».

Halle gave special lectures in Berlin to propagate the method of « Biological- or Artery Flaps » Dufourmentel, the renowned specialist in Plastic Surgery of France did likewise in the Society of Parisien Surgeons and in lectures in North and South America, where he was sent by the French Government to inspect and propagate French Plastic Surgery. Morax also gave a lecture in the Parisien Oculists Society about my « Biological- or Artery Flaps » to prove their great value. Lexer replied in 1922 in the Surgical Congress : « It is not necessary to use « Artery Flaps » especially for Plastic work in the face, because the skin tissue is so full of vessels ». This is not a good consideration because the best principles must always be followed in order to get the most complete results. The aim is not only to keep alive the transported piece « macroscopally », but the ideal must be to keep alive all that is possible even of the highly constructed cells. In trying to make our work more biological we shall sooner advance and enlarge the possibilities in doing so. I was able to introduce many new methods and results never before obtained, profiting by this principle. Until I began to transplant a finger, or thumb, only very few, about ten cases had ever been successful before, and many cases had failed.

I have since made 14 such cases which were, without exception, successful and on different occasions I transplanted, at the same time, different toes for fingers on one hand. At one time I transplanted together from one foot, four toes with metatarsi, with carefully combined tendons for bending and stretching, nerves, vessels, periost, ligaments, skin, with biological and practical success. This last operation we consider as a biological flap.

In the future we must always try to advance, and two problems are of great interest from this point of view :

In 25 cases cornea was transplanted on animals and different people tried transplantations on men, but it was not possible to get practical results, as the pieces, even when they remained alive, lost their transparency.

I was many times consulted by University oculists about this problem, and I think that a good result is possible. Many blind people could be healed in that case.

We must try to replace dim central pieces of Cornea by clear peripheral, well pedicled, Cornea pieces. We must begin in cases where only the surface is to be replaced. More experiments on animals must be done first.

The second problem is the transplantation of a limb, or part of it, taken from a fresh corpse. Twice I tried to transplant a pedicled « Biological- or Artery Flap » from one patient to another, both healthy and of the same blood group, but I had to separate them, before the healing on account of the high fever incurred. We must find and eliminate the cause of this fever by further study of blood groups and the manner to acclimatise foreign cells to each other. The experiments of Carrel and others to keep alive and to grow pieces of tissue « in vitro » can be broadened, perhaps to make it possible to keep alive a limb and even depriving it gradually of poisoning, subjective, personal elements, and perhaps preparing it to the special condition of the Receiver to whom it is to be transplanted, e. g. by placing it in ideal biological conditions and producing a really physiological unpersonal circulation through all the vessels during a large period, before the transplantation, in order to get it neutral and not poisonous for the receiver and to accustom the cells to live in conditions, that they were not used to before.

J. F. S. ESSER



PRÉFACE.

Il fallait un homme, il fallait un chirurgien comme l'illustre Esser, pour fonder un Institut international de chirurgie structurative, c'est-à-dire plastique et réparatrice, comme celui qu'il a conçu.

Car pour créer un centre chirurgical de cette importance, qui ne tend à rien à moins qu'à organiser pour l'Europe entière le traitement des mutilés innombrables atteints de difformités congénitales ou de ces lésions terribles dont la guerre nous a fourni de si tristes exemples, il fallait un homme qui eût non seulement donné des preuves de sa haute maîtrise opératoire, mais qui ait encore l'énergie nécessaire pour vaincre toutes les difficultés, qui accumulent les obstacles devant ces grandes entreprises.

Esser est cet homme !

Il a donné pendant et après la guerre des preuves décisives de la grandeur de son œuvre chirurgicale.

Il a transformé les règles fondamentales de la constitution des lambeaux cutanés, qui sont, par leur plasticité, l'élément primordial de cette chirurgie bienfaisante.

Il a démontré par ses succès que, dans les autoplasties de la face, il fallait employer non pas des lambeaux à large pédicule, difficiles à orienter, mais des lambeaux à pédicule étroit, faciles à diriger en tous sens, mais contenant dans leur racine non seulement les artères qui amènent le sang, mais surtout les veines, qui permettent par son évacuation régulière la nourriture normale du lambeau et cette vie d'où tout dépend.

Les exemples très nombreux que nous donne le maître hollandais des beaux résultats qu'il a obtenus, sont un témoignage suffisant, et de sa maîtrise personnelle et de la valeur de ses méthodes.

Mais, pour organiser cet Institut, il faut autre chose que le talent opératoire et la valeur scientifique ; il faut le courage dans l'action, la volonté sans défaillance capable de triompher de tous les obstacles. Esser est l'homme qui possède ce courage et qui montre cette volonté.

Il a su grouper autour de son œuvre les plus grands noms scientifiques de l'Europe, et même quelques-uns des hommes qui président à ses destinées.

Il a la foi, il a l'enthousiasme nécessaires à l'accomplissement de cette œuvre en même temps scientifique et sociale.

Et n'est-ce pas, aux jours où nous vivons, quelque chose de beau que d'associer dans une œuvre commune, pacifique et bienfaisante, tant de grands noms parmi les plus illustres de cette pauvre Europe, unis dans un même élan pour le soulagement des malheureux de toutes les nations.

Paris.

J. L. FAURE.

English translation on next page.

As I never wrote any book or article in French, I asked Professor Jean Louis Faure, who may be considered the most internationally known living French surgeon, to write a French preface to introduce this book in France.

PREFACE.

(Translation of the French text of Prof. Jean Louis Faure.)

A man was needed, a surgeon, like the illustrious Esser, to found an International Institute for structive that means plastic and repairing surgery, as conceived by him.

For creating a surgical centre of such importance, which aims no less than to organize for all Europe the treatment of the immense number of mutilated, suffering from congenital difformities or from those terrible injuries of which the war has furnished us such sad exemples, a man was needed, who had not only given the proof of his high surgical mastership, but who possesses besides the necessary energy to overpower the innumerable difficulties, and obstacles which accumulate such grand enterprises.

Esser is this man!

He has given during and after the war countless proves of the magnitude of his surgical work.

He has changed the fundamental rules of the character of pedicled skin-flaps, which are, by their plasticity, the essential element of this beneficent surgery.

He has demonstrated by his successes that, for the autoplasic of the face, flaps with broad skin-pedicles, difficult to manage, are of no use, but flaps with a very small pedicle, easily to turn in all directions, but containing in their pedicle not only the arteries, which furnish the blood, but especially the veins, which permit by their regular evacuation and cleansing the normal nourishment of the flap and its life of which all depends.

The numberless examples of the beautiful results he got, which the Dutch Master gives to us, are ample proof both of his personal mastership and of the value of his methods.

But to organize this Institute, more is wanted than the scientific value and the surgical talent; courage in action, the unfailing will to overcome all obstacles.

That is what is needed!

Esser is the man, who possesses this courage and who shows this will.

He has known how to group and crowd round his work the greatest scientists of Europe and even some of those men who rule its destiny.

He has the faith and the necessary enthusiasm to accomplish this social and scientific work.

Is it not beautiful, in the time in which we live, to have succeeded to interest and attach to a general, pacific and beneficent work, such great people amongst the most illustrious of this poor Europe, who all together feel the same ardent desire for the help of the unhappy wretched ones of all nations.

Paris.

J. L. Faure.

Biological- or Artery Flaps.

GENERAL OBSERVATIONS AND TECHNIQUE.

« Biological- or Artery Flaps » is the name we have given to flaps of skin which may contain other tissue such as muscle, fat, etc., all belonging to the territory of certain arteries and nourished by these arteries and their branches, evacuated by the accompanying veins. Their pedicle contains little more than lymph-, blood vessels and nerves.

In order that such a flap may remain alive when cut from its surrounding tissue the following conditions are necessary : —

- a) Outlet, by means of veins and lymphvessels, for poisonous encreta of the blood which are produced in the cells in proportion to their activity. It may happen that at first the veins and lymphvessels do not function, but under arterial pressure they may resume their functions, or small branches may become enlarged, due to arterial pressure, or blood may escape, as when incisions are made in the flap or leeches applied. The escape of poisonous encreta is as important to the life of the tissue as the supply of nourishment by the artery, and it is better to have no vessels at all than an inflow of blood, causing great activity in the tissue, with no outlet for the poisons arising from this activity. A free transplanted flap would have a better chance of living than a flap with artery intact and veins and branches definitively destroyed.
- b) Supply of nourishment by the artery and lymphvessels.
- c) The sympathetic, motor and sensory nerves play an important role in keeping alive the complicated cells of the tissue ; the exact importance of this role has not been sufficiently estimated but in the case of highly specialised cells it has been proved that the death of the cell always occurs when the governing nerve supply is cut off, and this does not occur in the case of simpler tissues, which can keep alive in such cases.

Until 1915 the general method employed by all surgeons in cutting pedicled skin flaps was to include in the pedicle as broad a band of cutaneous tissue as possible, which proved a mistake. The idea underlying this was that the broader the band, the more likely were the tissues of the flap to be kept alive, for it was thought, that the danger of mutilating the arteries, veins, nerves and lymphatics was less than when the skin of the pedicle was reduced.

In 1922 we suggested at the Surgical Congress in Berlin a method of cutting Biological- or Artery Flaps, which we had previously published in several periodicals, and demonstrated at various societies and schools of medicine. Our method was to cut flaps with a pedicle containing no skin at all, and it was therefore in this important respect quite the opposite of methods then in use.

The name « Artery Flaps » is added to establish the place of the « Biological Flaps » as the arteries are easily to find and feel and as their territory indicates the form and the size of the flaps.

This shows also the bad side to call them only « Artery Flaps », because it gives the impression that the artery should be the most important part of the pedicle, and *that is not true*. Veins, lymphvessels, sympathetic-, sensible- and motoric nerves are altogether important, but not so easy to find and their preparation would be dangerous. They are all situated in the territory of the arteries and therefore the name « Artery Flaps » is added, though the veins alone are already more important.

The pedicle thus only contains veins, artery, nerves and lymphatics, surrounded only by loose protective tissue. There must always be enough of this surrounding tissue not only to prevent direct mutilation of the vessels themselves but also to prevent branches being cut too near the main vessels, because the thrombus formed, when a vessel is cut near the main vessel, might too easily obstruct the circulation in the main vessel.

The idea underlying this method is that while the skin itself in no way needs to keep alive the tissues of the flap, its presence gives rise, when the pedicle is turned, to a pressure on the vessels and nerves of the pedicle. For it is apparent that when a pedicle containing a

broad band of skin is turned, as is often the case through an angle of 100° - 180° , there will be a stress on the inner and a strain on the outer part of the pedicle, in proportion to the angle of torsion. In addition, the ribbon-like pedicle, owing to this pressure, tends to become tubular, and between the two halves the unfortunate vessels are subjected to pressure, and the circulation possibly stopped owing to bending.

The disadvantage of the broad skin band in the pedicle increases in proportion to the degree of torsion; while there is no evidence to show that the skin itself aids in keeping alive the tissues of the flap, or that the necessary tissues cannot be kept intact when the skin of the pedicle is removed. Lastly, no skin is lost at the corrections, and there is no need for later treatment of the pedicle.

The flaps resemble leaves supported by a thin stalk and may be very broad themselves. There is no need to section the pedicle later. Perfect circulation and innervation are provided for and not only are the tissues preserved macroscopically but also the functions, less well known but possibly equally important, of the nervous system.

It is in cases in which operations were previously regarded as impossible, that these flaps are significantly successful, such as, for example, when it is required at the same time to cover and heal a wound which is atonic, without circulation and vitality, and chronically infected. The flap, in such a case, has to graft itself without any assistance from the surrounding tissue, and must carry with it, not only the nourishment necessary for itself, but a surplus to enable it to combat the poisons and toxins in the surrounding parts, and bring to them a new circulation.

Biological- or Artery Flaps have great possibilities in facial operations. The arteries which can be most usefully employed are the temporal artery; its ascending branch or the ramus anterior; the occipital artery; the frontal artery; the angular artery; the facial artery and its branches; and the eyelid artery.

On other parts of the body many different arteries can be used, notably the inferior epigastric, which gives very suitable flaps for treating wounds on the lower limbs, on the abdomen or on the genitals, and also the intercostal arteries.

Before tracing out the flap it is necessary to explore and find out the course of the artery by means of a careful palpation. This examination must be made before the local anesthesia, and before washing the skin with alcohol or tincture of iodine, because the skin would otherwise be hardened; similarly the examination is made before the surgeon's hands are washed and prepared. Care must be taken that the surgeon's own finger artery is not mistaken for the artery sought for. In very difficult cases, when we were uncertain as to the course of the artery we stopped the examination and recommenced next day early in the morning when the senses are most active.

The course of the artery having been ascertained and its path marked on the surface of the skin with tincture of iodine, the cutting of the pedicle and then of the flap is proceeded with. A shallow cut is made in the surface of the skin along the line of the artery, equal in length to the required length of the pedicle. From the bottom of this shallow cut two deep cuts are made to the right and left, each making an angle of 30° with the surface. These are the *roof cuts* and form the roof of the pedicle. These cuts gradually turn downwards till at the level of the artery they make an angle of 90° with the surface, and should be between 0.3 cm and 0.5 cm on each side of the line where the vessels are situated.

As a rule the flap arises gradually from the pedicle and is pear shaped. The perpendicular cuts on each side of the pedicle are continued round the flap, the shape of which has been previously traced out and indicated with tincture of iodine. After this the flap is freed by undermining from below, till the pedicle is reached, and the pedicle itself is then freed by continuing the perpendicular side cuts inwardly until they meet below the vessels, great care being taken to keep the artery protected by the surrounding tissue.

The size of the pedicle in cross section may vary from the size of a match to that of a pencil, and in length from 0.5 cm to several centimetres. Within the required limits, the shorter the pedicle the less is the chance of damage to the vessels. A long pedicle is only necessary when it is desired to pass it through a long narrow tunnel or channel,

and this is only possible when the flap itself is narrow, as the flap itself would have to pass through such a tunnel. When the defect to be repaired is some distance from the place from which the flap is taken, it is better to have a short pedicle and allow the flap to arise out of it very gradually so that it has the pear shape very much elongated, than to have a long pedicle and less elongated flap, nevertheless flaps with long thin pedicles are often used.

The defect or wound which is to receive the flap is first of all prepared, and a cut is made from the commencement of the pedicle itself to the nearest point of the defect. This cut, which is to form a bed for the pedicle, must be deep and wide enough for the pedicle to lie in it, and to make this possible, a certain amount of undermining of its tissues is often necessary, especially in cases when it has to receive the beginning of the flap as well as the pedicle. The pedicle and the beginning of the flap must be able to lie in it without any parts being above the normal surface. The cut from the pedicle to the defect bifurcates at a distance of about $1/2$ cm from the pedicle descending perpendicularly and the two resulting cuts continue obliquely until they merge with the roof cuts. The flap may then be brought into the defect and the pedicle brought into the bed formed for it by these cuts.

Before sewing the covering over the pedicle and the edges of the flap, the secondary defect (i. e. the area from which the flap was taken) is treated. If possible its edges are sewn together. But if this is impossible, long «loop stitches» of metallic thread (bronze, silver or brass) are made, with a few similar stitches of stray silk among them. These «loop stitches» are in pairs, each pair forming a complete hook and knotted. The stitch enters the surface of the skin about 1 cm from the edge of the defect, comes out into the wound, crosses above the wound, enters the flesh at the opposite side and emerges on the surface again, about 1 cm from the border of the defect. Then it enters the skin again about 1 cm from where it emerged and 1 cm from the edge of the defect, and comes out into the wound; a piece of gauze is rolled firmly to form a hard «bean» and this is placed on the surface of the skin below the thread which is then drawn

tightly over it to hold it in place. The thread then recrosses the wound, enters below the edge of the defect to emerge 1 cm from the point where it first entered and 1 cm from the edge of the defect. The thread as it crosses and recrosses the wound forms two parallel lines. A similar «bean» of gauze is placed on the skin between the entry and exit of the threads, and the ends of the thread are knotted firmly over it. The whole stitch is thus a complete and closed loop, having the shape of a link of a chain. We used these stitches to close the large secondary defects caused by taking pedicled flaps from one leg to the other as we described in 1917 (Brun's Beiträge, Band 108, Heft 4, P. 514). Beneath these stitches is placed on the secondary defect wound a piece of skin (Thiersch graft) from the inner side of the upper arm or the inner side of the thigh. This skin is passed under the stitches across the wound, and by the stitches is kept in place on the wound by a certain amount of pressure. The places from which these grafts are taken are treated by brushing the surrounding skin with mastic solution, and without further dressings, as aseptic roller bandage is wound several times round the limb, covering the wound. After a few weeks this bandage, when unwound, will come off the wound freely, when the wound is healed and a new epidermis formed.

The edges of the flap are sewn to the edges of the original defect with the finest silk and without tension of any sort. Similarly the edges of the groove or channel in which the pedicle lies are joined, and also the edges of the wound left by the removal of the pedicle. Compressing bandages should never be used on the flap and especially not on the turning of the pedicle. The region of the operation can be protected by sticking a piece of aseptic bandage over it, after having painted the surrounding skin with mastic solution. We prefer, however, to use no bandage at all, but to dust the region with a very small quantity of powdered calomel. This mixes with the secretions from the wound which, when dry, form the protective crust. As long as this crust remains dry, the calomel is inactive, but as soon as infection threatens and causes new secretions the calomel is slowly changed into sublimate and this disinfects any fluid which may enter the wound.

It is of the greatest importance to keep wounds dry, because fluid acts dangerously in carrying germs into the minute spaces in the tissues. Another point, the importance of which cannot be overestimated is the complete immobility of the surrounding parts of the wound; any movement will serve to press germs deeper into the interior, besides causing microscopic tears in the healing tissues.

More detailed descriptions will now follow of the methods of using flaps from the territory of various arteries, with an account of the special technique required in connection with each artery, together with descriptions of plates illustrating these methods and their results. The present classification of these arteries and cases is made entirely from the point of view of practical surgery.

CONSIDERATIONS BY LEADING MEN
ABOUT SKIN FLAP PEDICLES BEFORE THE INTRODUCTION
OF OUR BIOLOGICAL FLAPS.

The principles of the biological- or artery flaps, followed since 1914, have shown them preferable by far to the methods used generally for pedicled flaps before this date, whether, they consisted only of skin or other kind of tissue or of a different combination of tissues.

Formerly following the advice of the great Dieffenbach, surgeons avoided taking a pedicle containing an artery, and when it could not be avoided, or if they found an artery in the pedicle, they bound it, because, Dieffenbach had declared, arteries in the pedicle cause danger of necrosis by an overabundance of blood; in this abundance was seen the general origin of the necrosis, and in case of danger of necrosis, they, generally, tried to diminish it by numerous incisions, so that the superfluous blood could escape.

But Dieffenbach did not exactly realize the situation. The danger of necrosis in the pedicled flaps does not generally come directly by the great influx of arterial blood, which is pure blood full of nourishment, but mostly indirectly by the want of outflow through veins and lymph-vessels to clean the tissues and liberate them of the toxines. In such cases, if the outflow is wanted and at the same time the arteries function, the result is that the influx of blood is too great and this hyperaemie increaces the vitality and functions of the cells in the flap, which has been proved by Bier of Berlin. The consequence is that the life in these cells produce more poisons than normal. These poisons are the refuse of assimilation and dissimilation.

In these special cases Dieffenbach had seen, that he could ameliorate the condition of the flaps by numerous incisions, by which these dangerous poisonous liquids could come out and logically the blue-back colour, that existed before, disappeared by this remedy. In fact it often showed a good result so quickly, that the satisfaction felt by the surgeon made him exaggerate the disadvantage of an overabundance of blood, because the bad colour had disappeared. However the definite healing was not constant, and the advantage acquired was not so positive, so that it would have been better to have left the situation as it was

before, and to await the vivifying by itself. The disadvantage of these incisions was, that they destroyed many little vessels, damaged cells and gave new wounds with their bad consequences.

In these cases, it would have been much better to undo more or less sutures, according to the extent of the danger, and in that manner open the vessels, already cut, without giving cause for new mutilations of the flaps. Leeches could be applied on the flaps and their sides.

After the danger was over, the sutures could be resealed and a healing by « secondam intentionem », as named by the well known Billroth, could be produced.

Now, it is no longer surprising, that Dieffenbach let himself be led by the direct and remarkable result of these incisions, and therefore cursed the arteries and condemned them to always be sacrificed in the pedicles.

According to our method « biological- or artery flaps » the arteries are, generally, of great utility in the pedicles and not only must they be retained, but they must be sought for to have them in the pedicles as a useful element to assure the life of the flaps. Logically continuing this idea, we condemn all the other elements in the pedicles to disappear, excepting the veins, lymphvessels and accompanying nerves; the veins and lymphvessels being also necessary, perhaps even more necessary than the arteries.

Although these elements are so cardinal, we still added the name of « artery flaps », because this name facilitates most to find and determine the flaps, and the other elements are always present, if the artery, with its surrounding tissue, is in the pedicle.

Still a few years ago a well known American constructive surgeon wrote in his book : *The pedicle should be as broad as possible « as a general rule the flap should not be longer than two and a half or three times the width of the pedicle »*.

This shows how useful it will be when the principles of our biological flaps are known.

All other tissues are disadvantageous in the pedicles, whatever they are, bone, cartilage, fat, muscle and especially skin. Formerly, skin was retained as much as possible, because it was thought, the more wide

was the bridge of skin, the less would be the danger of necrosis, but all these tissues are disadvantageous, because they bear too heavily on the vessels, especially if the flap is greatly turned.

It was thought before, that the circulation in the skin of the pedicle assured the life of the flap. So it was taught to us as students. No attention was paid to the underlying nerves and vessels, according to Dieffenbach's advice. The centripetal-, centrifugal- and sympathetic nerves were not treated. The importance of them and of the underlying vessels was neglected. See always plates page 20.

DESCRIPTION OF THE PLATES ON THE Pages 21 and 22.

The flaps are designated on the plates 21 and 22. On plate 22 is seen the position of the arteries generally used. There are also others, which are not shown in the drawing and may be used for skinflaps.

All arteries, always accompanied by the veins and nerves that lie close to them, are each time designated on this sketch, all together in one line; in other words, one line always indicates the position of the arteries, veins, nerves and lymphvessels together.

On plate 21 are indicated the different « biological- or artery flaps » in accordance with their forms and size, and the places from which they are taken.

Each one should be judged and comprehended according to the conformable parallel lines on every flap, and the manner in which they overlap each other. The parallel lines are to be thought to continue under the flaps, which overlap them ; the larger ones being overlapped by the smaller ones in order not to be obliged to make a sketch of a head for each flap. In this manner the sketch shows how different skin flaps can be produced from every artery. The flaps need not be of the same form as one of the examples we have given, but can have every particular form, if only they contain the vessels and nerves in their pedicle, and if they develop themselves in the direction of the territory of the arteries.

It is clear, which are the arteria temporal flaps, because they take their pedicle in front of the ear, while the arteria angularis flaps are situated between nose and cheek, and the arteria frontal flaps above the latter which take their pedicles just at the inner limit of the eyebrows and including in their flaps the skin tissue from the centre part of the forehead. Nevertheless, they can also be taken from very broad parts or even the complete forehead ; the reason of which is that the frontal artery is rather developed and has a great many communications with the vessels of the ramus anterior of the temporal artery. Even when the last artery is cut, its branches can be filled by the communi-

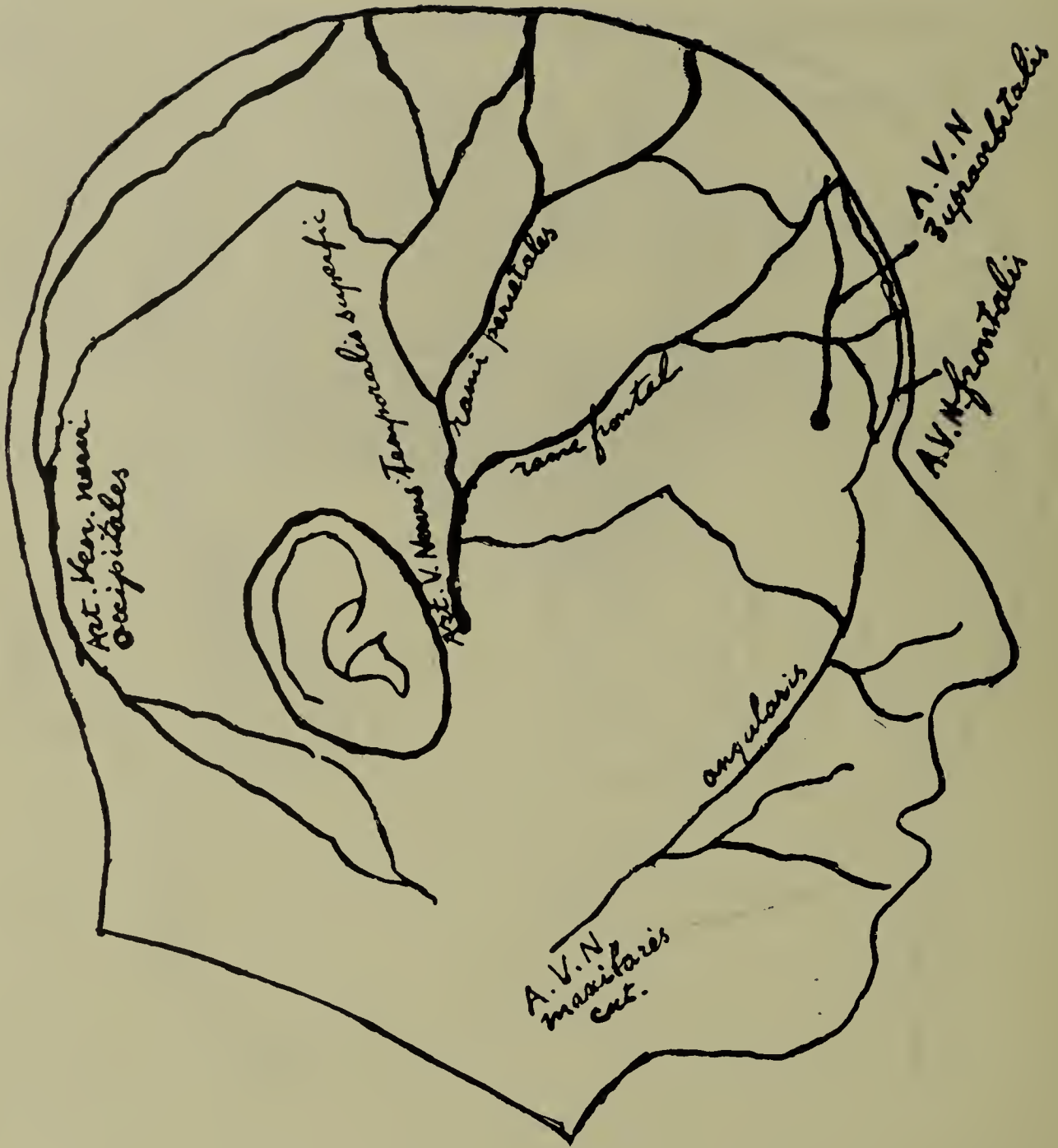
cations of the frontal artery. The same occurs with the veins and lymph-vessels.

The arteria supra orbitalis flaps are also shown on the sketch, taking their pedicle in the middle of the eyebrow.

The ramus anterior flaps are shown beside the main arteria temporal flaps, taking their skin from the forehead even in much larger dimensions than is drawn on the sketch and taking their pedicle as described in their text.

Besides, the arteria occipitalis flaps are shown in two directions, the two flaps pointing upwards benefit from the main artery and the other, drawn in a horizontal position at the base of the neck, benefits by a branch of the arteria occipitalis.







A. Temporal Flaps.

GENERAL OBSERVATIONS AND TECHNIQUE.

Flaps taken from the territory of the temporal artery are of great importance and can be used for repairing large defects on every part of the face. Their usefulness for treating the more commonly met defects and wounds is only surpassed by the use of frontal flaps, i. e. flaps taken from the territory of the frontal artery. If the flap is taken from the region of the main artery, it is usually hairy, and for this reason is mostly used in repairing defects of the lower cheek, chin, upper and underlip in men. We have used it in cases of mutilations caused by the war, of cancer and other growths (tumours), of wounds caused by burns, and of tissues destroyed by X-rays. In cases of the latter the flaps are specially successful as no other methods have succeeded. Such flaps can also be used in cases of wounds caused by chronic inflammation, giving rise to the formation of connective tissue and scars, with obliteration of blood vessels. In such cases the flaps have not only to bring sufficient nourishment for themselves but to heal and provide with new circulation the surrounding tissue.

Temporal Flaps may be divided into two classes,

a) those of the territory of the *main artery* mentioned above, and

b) those of the territory of the *ramus anterior* which crosses the forehead to the middle line, running half way between the line of the hair and the line of the eyebrows. This artery produces flaps of hairless skin and is especially useful for defects of the eyelids and upper cheek, nose and nostrils (though nose defects are usually repaired with flaps from the territory of the frontal artery). In women it is used for the lower parts of the cheek, and gives a better result than the hairy temporal flap with hair roots removed. The latter becoming rough and hard by the inner-cicatrization. The presence of hair on flaps taken from the region of the main artery is in the case of men a definite advantage, for used as a beard or moustache it hides scars and differences of appea-

rance, which always exist in skin of different parts. The direction of the growth of the hair need not be an obstacle, for this can be changed by means of regular brushing and by fixing with mastic solutions, and by permanent training in the required direction, giving a beard of quite natural appearance.

As a rule the scars resulting from the first operation have to be corrected by subsequent operations. In the first operation it is better not to aim at a result with the maximum of good, from the point of view of appearance, but to be certain that enough and possibly even superfluous material is brought to the defect. When all has healed and a few months have elapsed, inequalities other than those which time will remove, can be made good by a minor operation.

It will be seen from the accompanying plates that generally only a very short pedicle is used, from which the flap is developed gradually, and that the proximal tip of the flap hardly moves when the flap is turned from its original position. In many cases flaps from both sides are joined below the chin, or cut at once as one flap forming a double pedicled flap passing round the face and under the chin like the chin strap of a cap. See always plates pages 21-22.

a) Main Temporal Flaps. Special technique.

The pedicle always arises about 1 cm in front of the upper part of the ear and directly above the cheek bone, where the artery is easily found by palpation. First of all the hair is shaved off a region of the scalp including the proposed region of the flap and some distance all round it. Before washing and preparing the skin the position of the artery is traced by palpation as far as is necessary, i. e. to the limit of the flap, and its path is marked on the skin in tincture of iodine.

The cutting of the pedicle follows the general rules given above.

The main temporal artery, with a few exceptions, runs in a nearly straight line to the middle of the top of the head, and the flap is cut to suit the size of the defect, but it is always in the form of an elongated pear with the line of the artery as axis. Such a flap may be as large as the patient's hand, and when large flaps are taken from both sides more than half the entire covering of the top of the head can be used. It is not necessary to stop at the line of the hair and forehead, but as much of the forehead as is desired, up to the line of the eyebrows, can be taken without danger. If the forehead be included in this way the flap will contain the ramus anterior as well as the main artery.

The treatment of the secondary defect follows the lines already described above; the edges are brought as near together as possible by means of «loop stitches», and a Thiersch graft from the leg brought under them.

The description of the following cases will not be given in great detail as the large number of plates will help to show the methods of operating and their results. The plates are only intended to show the results of the initial operation, which has as its object the bringing of material to the defect. In this work we deal with nothing that does not pertain to biological flaps, and the cases are shown without subsequent corrective operations which might tend to obscure the immediate result of an operation concerned solely with the biological flaps.

Cases of Main Temporal Flaps.

1. *Restoration of Chin.*

Plates 1 U 1-6.

Patient U.

Clinic August Bier, Berlin.

See page 27.

This case shows how far it is possible to take the flap from the region up to and beyond the middle line of the head. It proves how strong and safe the circulation is in the vessels of the pedicle, for they not only supply their own territory but by means of capillary connections serve to circulate blood in the region beyond the middle line, which up to now had been provided for by vessels on the opposite side. This new circulation in the region beyond the middle line of the head, which is effected by minute capillaries, is particularly difficult in the case of the veins, which work by suction, as the suction itself tends to diminish further the calibre of the vessel and increase the friction, with a resulting loss of power in the circulation.

After the healing the large veins regain their great function in developing communications with the surrounding veins.

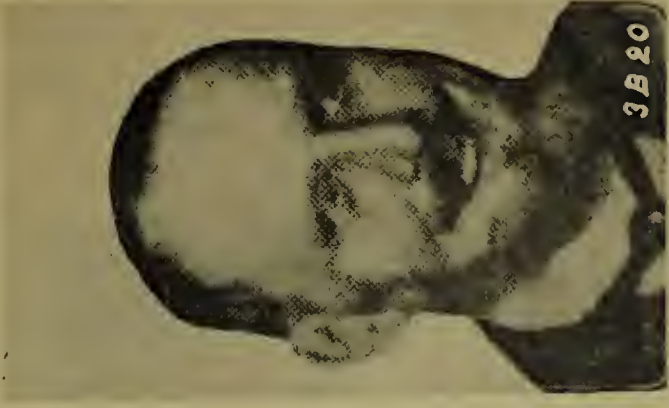
Patient U. had been operated on by another surgeon, before he was handed over to us for treatment. A cancer of the lower lip was the cause that the chin and middle part of the lower jaw had been taken away, and large open wounds were left for after-treatment with X-rays and radium. A dental prothese combined the remaining pieces of the lower jaw.

We first constructed the inner part of the mouth by closing the defect with flaps which had the skin part turned to the inside of the mouth. They were taken from the right and left under parts of the cheek, but this operation is of only secondary interest to the Biological-Artery Flaps method. It is seen clearly on plates 1 u. 1-3.

A single Temporal Flap as is demonstrated on the plates 1 u. 3-6 covered at once the very large defect of chin and both cheeks.

The old patient had suffered considerably from his cancer, his first great operation, and the large granulating surfaces of his wound.

The large flap with only one pedicle, and including a part of the other half of the head, communicating only by very small vessels



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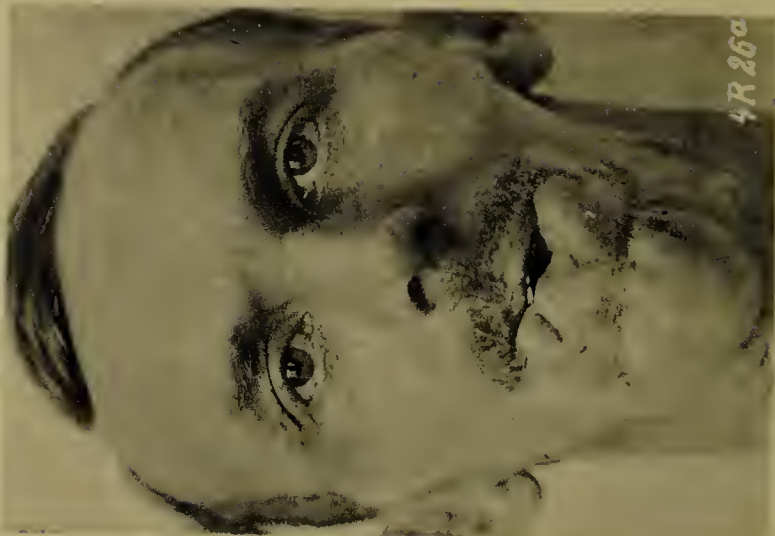
We first constructed the inner part of the mouth by closing the defect with flaps which had the skin part turned to the inside of the mouth. They were taken from the right and left under parts of the cheek, but this operation is of only secondary interest to the Biological- or Artery Flaps method. It is seen clearly on plates 1 u. 1-3.

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(mostly hair-vessels), did not suffer at all, but healed entirely, even on the granulations, which are always infected, in spite of the high age of the patient and all his sufferings before.

1. Plates 3 B. 17.18.19.

Patient Prof. B, Berlin.

See page 28.

This patient had the tongue, jaw, and chin destroyed by shrapnel.

Plate 3 B 17 shows the condition he was in when he came to us for treatment, having already received treatment at other hands. In this case it was necessary to bring sufficient material not only to cover the existing scar but also to provide more suitable surrounding tissue than the existing scar tissue for the healing of a large free bone graft underneath, which had to be introduced afterwards.

Plates 3 B 18 & 19 show the flap placed in a position where it could give most help to the healing of the future bone graft. It will be seen from the plates that the flap is rolled. In our earlier operations we rolled the flap in order to lessen any risk of infection or necrosis, and a subsequent operation was necessary, but now we lay the flap flat on the skin and perform in one operation, what used to require two. The plate, however, shows very clearly the points we wish to demonstrate, for the tubular form of the flap shows very well the condition in front of the ear and that there is no twisted skin at the region of the pedicle or at the origin of the flap.

Plates 4 R 20-26^a.

Patient R; Berlin.

See pages 28-29.

Patient R. had received severe wounds, which had destroyed a larger part of the lower jaw, chin and tongue. Plates 4 R 20-22 show the patient after the original healing of the wounds, and with a dental prothese made by Professor Schröder in Berlin. The prothese was to serve as support for the new tissue to be brought to the region. Plate 4 R 23 shows the prothese partially covered with flesh and with dental

plate. To this situation we brought a temporal flap and the following plates show the results. In this case only sufficient material was required to cover the chin and we were able, after a few weeks, to return to the place it was taken from, all the superfluous tissue of the flap between the limits of the chin and the pedicle. In similar cases later on we made the pedicle rather longer and the flap arises from it more gradually so that there was practically no superfluous tissue in the flap or pedicle, and nothing to be returned; this has the advantage that the flap is permanently supplied with its own vessels and nerves.

Plates 6 D 39-40.

Patient D.

See page 33.

Patient D was a very severe case of necrosis caused by X-rays. Speaking of X-rays in general, it may be said that they gave origin to the most difficult plastic work, and also to injuries most difficult to heal, before the Biological- or Artery Flap method existed.

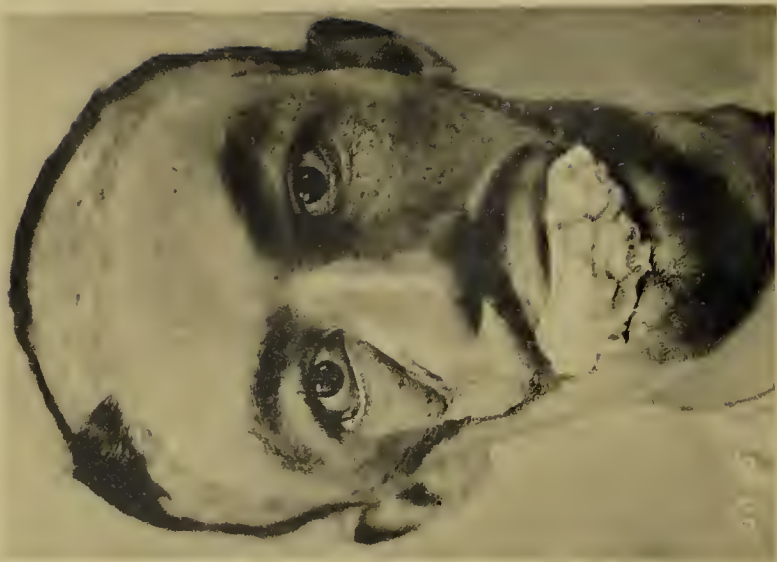
The Biological- or Artery Flap, brought from far away, from parts which had not suffered by the X-rays, is the only method without competition able to help in such cases, for two reasons. First, this flap is sure of its own existence by bringing its own nourishment and its own waste-pipes to expel products of life. Secondly, its cleaning service and its nourishment is so sure and powerful that it is not only sufficient to assure its own life, but it first helps by its contact alone to purify the surface of the weak wound, which is covered by milliards of dead tissue particles, that are poisoning by their toxins the surrounding still living particles, which fight despairingly, almost without circulation or innervation. We introduced this principle and published it see n^r 47, p. 172 in 1919.

By and by the flap takes a slight contact here and there and begins to grow together with cleaned parts of the wound, while its cleaning, nourishing and innervating power is giving new life to the almost dead wound surface. More and more the two grow together, always leaving room for pus to escape, because, in such cases, the flap is fixed with only a few metal sutures here and there to keep it in the right place.

The result, see plate 6 D, was obtained after several weeks, but it was complete and satisfactory.







Plates 11 H 77-78.

Patient H.

See page 33.

P. H. shows a similar case and needs no further explanations.

Plates 5 H 27-38.

Patient H.

Berlin. Clinic Bier.

1917-1918.

See pages 34-35.

This patient had lost most of the lower jaw, the greater part of the tongue, part of the upper jaw, the whole of the right cheek, the outer part of the right cheekbone, and part of the left cheek. Plates 5 H 27-28 show the condition of the patient after the healing of the original wounds. Plate 5 H 29 shows the patient after an operation made to close the opening and defect in the upper jaw. Plate 5 H 30 shows the patient after an operation in which a double pedicled temporal flap was made with the borders of each side joined under the skin and the flap rolled to form a sausage-like body, hanging from the pedicles but with no other contact with the face. A comparison of Plates 5 H 27 & 30 will show that a great part of the hairless forehead had been included in the flap in order that there should be plenty of material. Plates 5 H 31-33 show how the flap had been opened along the suture and stretched, so that instead of being circular in cross-section it became semi-circular and of considerable size. The upper border was stitched to the upper border of a long cut circling the neck from one ear to the other, and passing in its lowest part the upper anterior part of the neck, the borders of which had been rendered mobile by undermining. The upper border was turned upwards and formed afterwards the inner covering of the new underlip. The lower border of the flap was sewn to the lower border of the neck. Plate 5 H 38 shows a later stage after the upper scar had been corrected and the model of chin and mouth developed and made more natural. Plates 5 H 34-37 show the condition of the secondary defect in the scalp. A large hairy pedicled flap was brought over it from behind and the patient was subsequently able to comb the hair over the whole head and so hide the scars.

Plates A 1-11.

Patient A.

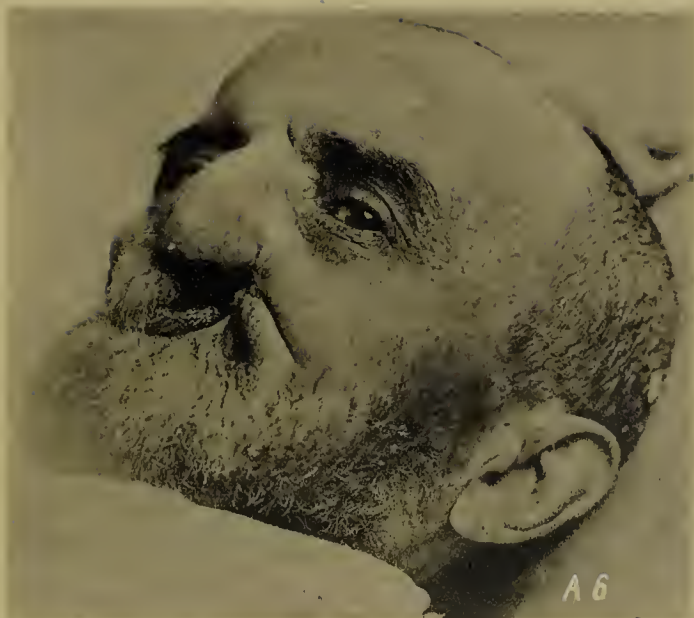
Berlin. Clinic Bier.

1919-1920.

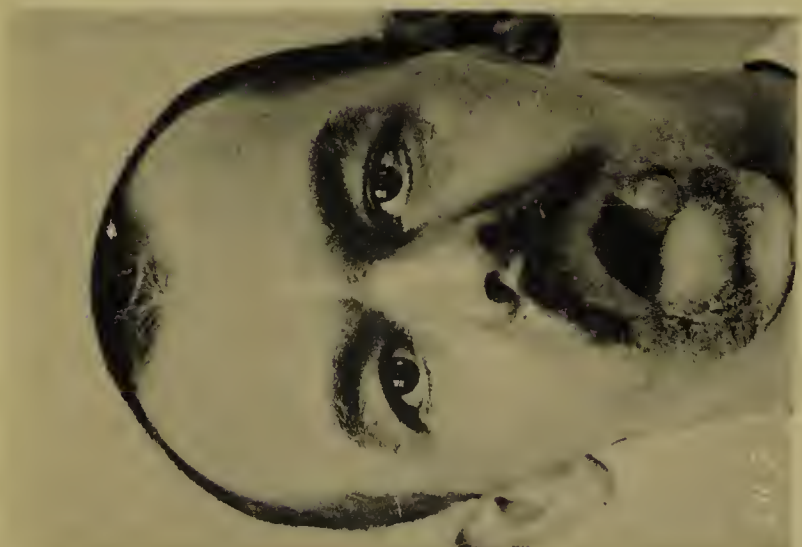
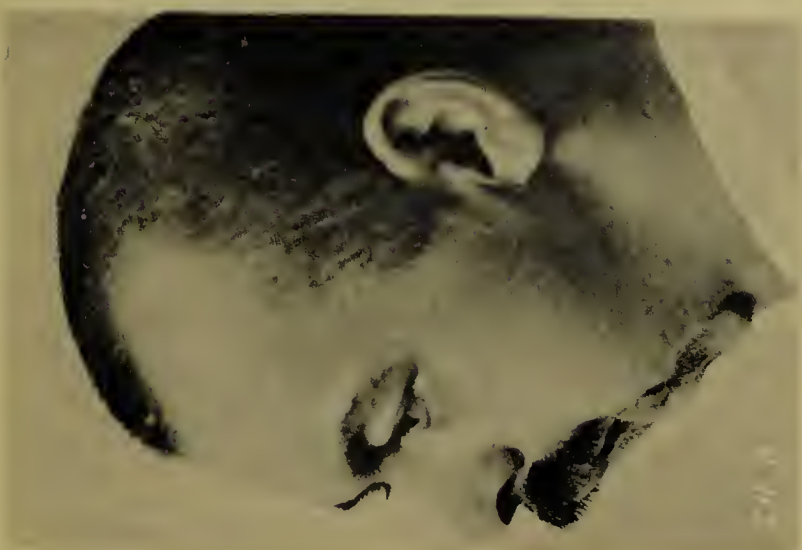
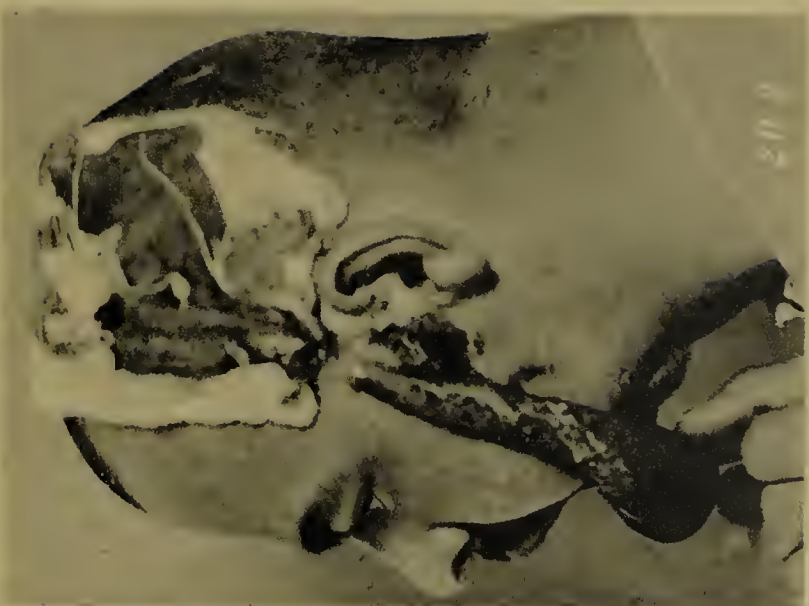
See pages 39-40.

Plates A 1-2 show cancer which had destroyed both lips, parts of both cheeks, and part of the lower jaw. The case was a very difficult one on account of the great age of the patient and his weak condition — in fact it appeared at first sight hardly possible to operate. Nevertheless two major operations were made, one by the use of a large temporal flap, and the second by a rotation of the cheek, by the method we introduced and which is described elsewhere. (N^o 4. 39. 69 of the list of publications of author.)

The ultimate area to be closed had to be about twice the size of the original defect shown on Plates A 1-2, as a considerable part of the surrounding tissues had to be cut away to prevent danger of recidivation, and the inner lining of the mouth had also to be removed and replaced by skin flaps. Plates A 3-5 show the result of both operations. It is seen that the upper lip is still absent. In this very difficult case the portion of the temporal flap farthest away, from the pedicle, suffered necrosis. This is a rare exception to the general result and the only case of it among the cases described in the present work. It was not due to faulty technique or the whole flap would have died, for the vessels either function fully or not at all, but was caused by the general weak circulation combined with the infection and with the result of continual movements of the tongue against the part of the flap forming the lip. These movements cause obstruction in the circulation at the line between the new lip and the new cheek, which line acted as a hinge at every movement of the tongue. That immobility, the value of which cannot be overestimated, was not preserved. Plates A 6 & 7 show how a further operation brought the superfluous tissues of the cheek into the defect of the upper lip. Plates A 8-11 show further corrections and modelling of the upper lip and cheeks.









Plates 2 H 7-16.

Patient H.

Berlin. Clinic Bier.

1917-1918.

See pages 41-42.

These plates show patient H in a similar but not so severe a condition as described above in connection with Plates 5 H 27-38. Plate 2 H 9 shows how the pedicle is without any skin and is only covered by the sutured borders of the longitudinal cut over it.

Plates 7 B 41-50.

Patient B.

Berlin. Clinic Bier.

1917-1918.

See pages 45-46.

This case was also one of extreme mutilation of chin and lower jaw, but the tongue was only damaged underneath. Plates 7 B 41-42 show the patient shortly after he was wounded, the wounds having been closed as far as was possible by stitches, over lead plates. This case demonstrates very clearly how large can be the flap taken with a single pedicle, and also how long, passing some distance over the middle line of the head in the direction towards the other ear, so that the whole chin defect, though it reached to only a few cms from the opposite ear, could be repaired with a single flap. The flap was indeed large enough to include also a sufficient area of the hairless forehead to form a lining to the mouth. Plates 7 B 46-50 show the results of the first operations; the patient in the end had a perfectly normal appearance.













Plates 8 D 51-54.

Patient D.

Berlin. Clinic Bier.

1917-1918.

See page 47.

In this case the mutilations were much less severe than in the foregoing case. The principal object of operations made after the original healing, shown on Plates 8 D 51-52, was to give the patient a more normally shaped face by building a chin and by supplying enough material to the mandibular region to make possible a large bone graft for restoring the jaw. Plates 8 D 53-54 show the condition shortly after the first operation.

Plates 9 N 55-67.

Patient N.

Berlin. Clinic Bier.

1917-1918.

See pages 47-48-49.

Plates 9 N 55-58 show the patient before he came under our treatment. He had already undergone several operations, but in vain, for the restoration of the chin. We were able, in this case to restore the chin with a single pedicled temporal flap, as is seen on Plates 9 N 59-60, and, after a few weeks, when it had healed, to return a part of the flap to its original place, so that the scalp in the end had only a small defect which could easily be covered by brushing the hair over it. We do not explain here how we formed a new under lip, as is seen on Plates 9 N 64-67, as it has no bearing on the subject of biological- or arterial flaps. The patient in the end had a perfectly normal face.

Plates 10 H 68-76.

Patient H.

Berlin. Various clinics.

1917-1920.

See pages 53-54.

This case was a restoration of cheek and chin on the largest scale, and was rendered more difficult by the weak condition of the patient at the beginning. Nevertheless the result was beautiful. The patient was able finely to remain clean shaven as his face was so normal that a beard to hide scars and inequalities was unnecessary.

Plates T 221-227.

Patient T.

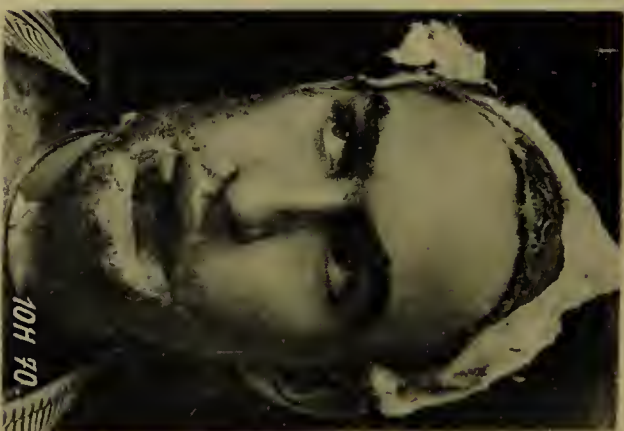
See page 147.

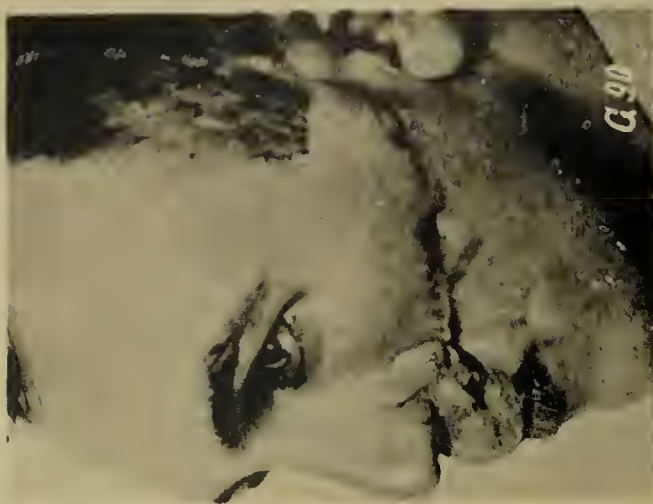
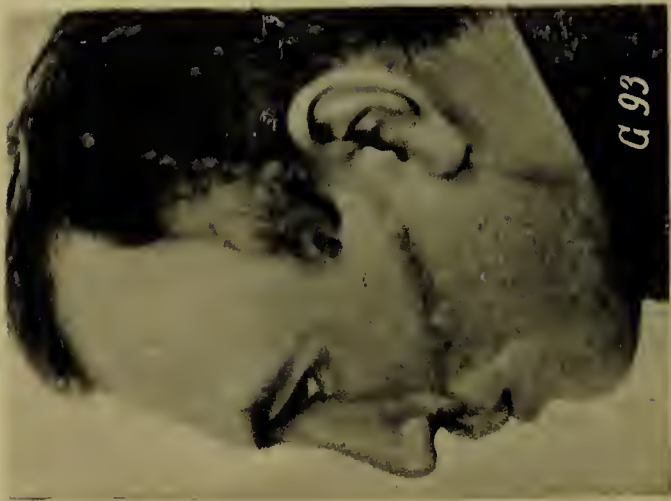
This patient had been operated before with angularis flaps to repair his mouth. See page 149.

This was a similar case to that shown on Plates 8 D 51-54. Here it was necessary to restore the chin and to provide suitable material to receive a large bone graft. The plates show the type of operation quite clearly and it is unnecessary to repeat the details of the procedure.

(See pages 47 and 51).







2. RESTORATION OF UPPER LIP.

The construction of the upper lip only from a temporal flap is simple and always the same, so that we only give a few examples.

Plates G 88-93.

Patient G.

Berlin. Virchow Krankenhaus.

1920.

See page 53.

This patient had received a gunshot wound which had resulted in the mutilation of the upper jaw and part of the nose, and a broad scar across the left cheek. The upper lip was destroyed. After the original wound had healed, it is seen on Plates G 88 & 89 that the mucous membrane of what remains of the upper lip is reverted and turned upwards to the level of the nose. In such cases it is usual to take a long pedicled flap, the flap being cut from the top of the head, the size and shape of a normal upper lip. The pedicle must be so long that the flap can form the new lip without any tension in the pedicle. The pedicle has to cross the cheek from its point of origin and is received by a groove cut in the cheek for the purpose. In this case the groove took the way of the existing scar, and ended at the upper left hand corner, as can be seen in Plates G 90 & 93. Plate G 93 shows the region from which the flap was taken, the hair being parted to show the scar. The treatment of the nose is not dealt with here.

Plates H1-H9.

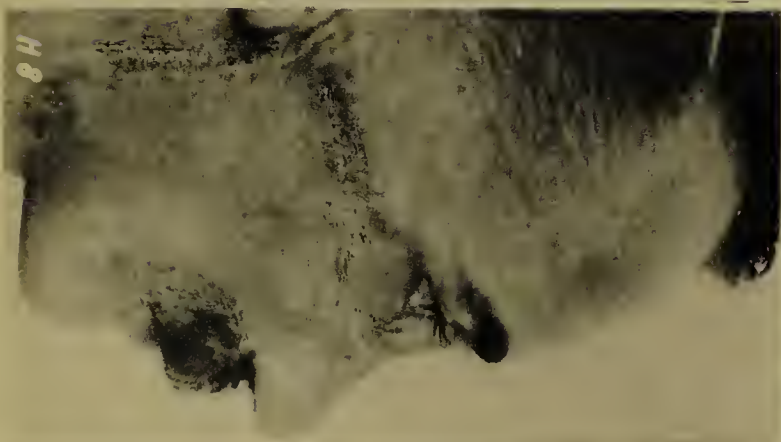
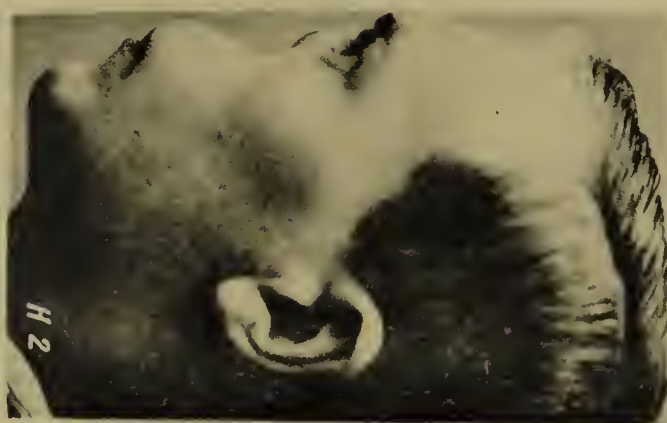
Patient H.

Berlin.

See page 57.

This patient who had lost his nose, his upper lip and the middle parts of both upper jaws, got a new nose and upper lip by our method « the rotation of the Cheek ». (See list of publications on page 147.)

Only to get an abundant moustache, which he preferred, we used a Temporal Flap (see plates H 5-9) to fulfill his wish. As the plate H 5 shows, only the first small part of the pedicle missed the skin part, the rest of the pedicle was largely protected by skin and other tissue. We proceeded in this manner first during the development of the biological- or artery-flap method so as to be sure of keeping the flap alive, and soon afterwards we established that we could, without risk, take the whole pedicle without any skin, but in such cases the pedicle should be placed in a cut of the skin in which it must pass, or in a tunnel underneath the skin large enough to let the flap pass through.





Plates P 1-2.

Patient P.

Breslau.

See page 58.

Patient is shown on plate P 1 before the operation and on plate P 2 after the operation. It is difficult to see on P 1 that the left half of his upper lip was entirely scarred. He brought this bad photo with him, and we forgot to make a good plate before the operation. To get a good symmetrical result in such cases, the skin of the upper lip must be completely taken away, both good and bad parts, and reconstructed at once, because the character of the hair of the head is totally different from the moustache hair of the same patient, though the hair of the head can replace the hair of the upper lip, and always looks quite natural.

Many weeks after the transplantation, a vertical cut was made in the middle of the lip, and from the bottom of this incision is cut away, to right and left, a wedge of the deep skin tissue containing the hair roots. This wedge must be over the total length of the cut, and two millimetres wide, in order to get the natural hairparting in the middle of the moustache.

Plates R 1-2.

Patient Lieutenant R.

Berlin.

See page 58.

Plate R 1 shows the patient before and R 2 after the first operation. The correction, making the parting of the moustache, had not yet been done.

Bad and good Flaps

It often occurs, that patients come to us with the results of operations, done by other surgeons. This may be, either, that they were not pleased with these surgeons, and have left them for this reason, or that they changed for some other reason.

In both cases, our duty and interest and the interest of the patient, besides our branch of specialist work, will all profit, if we try to preserve most of the results of these operations.

This can be done in two ways : first, to preserve and use the greatest quantity of the transplanted material, and secondly, by using an operation method, that shows the continuation, or the greatest connection or the most logical combination with all work, that was produced by the other surgeons.

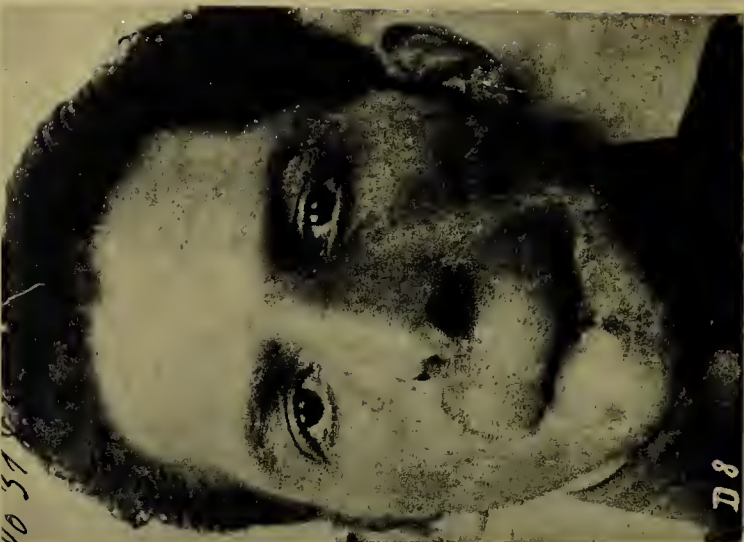
In the first place, as regards the patient, he will feel the greatest happiness and the most sincere sympathy, confidence and respect for our specialist work and the greatest hope for the future, if the coming operations form in his mind a logical continuation of the past ones.

Our branch will find more appreciation in doing in that manner from the family, friends and acquaintance of the patient and from the other people in general, than if we commence with quite other systems, which are quite independent of and neglect the results of the past operations, or worse, if we would not accept any useful part of them even destroying all, or most of it, and in condemning, with or without words, the work of our colleagues.

The consideration of this problem is much more necessary than in the general surgery, because in its territory, the operations, as a rule, are much more independent the one from the other and besides nearly every operation may be complete.

In the structive surgery, however, in the greater part of interesting mutilations, it is of great profit for the beauty of the result in the end if the patient is operated in different parts at different times.

Besides it is more economical, and the total danger for his life, the



local danger of necrosis of transplanted material, will be diminished. If the transplanted material will be insufficient by necrosis, the esthetical result, obtained by less material than practice had found necessary or, at least, preferable, will be inferior.

The preservation of a logical combination of our continuing operations with those of our predecessors, will develop a concordance and friendship and even connection and exchanging of opinions by letters or conferences, between the former and the new surgeons, which must give benefit to : 1° our scientific orientation and development, and harmonious fellowship in general, which must altogether develop our branch of young specialist work, and 2° continue to develop science and art.

We always promoted this manner of doing so and made it noticeable in the following case, which we will describe in our next pages, and this is also to be seen in different publications, concerning special cases, f. i. in the number 44, in the year 1918, of the *Deutsche Med. Wochenschrift*, entitled : « *Eigenartige Ausnutzung einer misslungenen plastischen Operation* », which means : « *Taking advantage of a bad operation* », and in the number 33, in the year 1922, of the « *Zentral Blatt für Chirurgie*, 49. Jahrgang » : « *Einfache Rettung aus schwieriger Lage bei Gesichtsverstümmelung durch Epithel Einlage* ». The translation of this title is « *An easy escape from a serious condition in mutilation of the face, by « Epithelial Inlay »* ». See page 61.

The patient Uv... came under our treatment in a condition as indicated by plate 1, in the Surgical University Clinic of Geheimrat Prof. August Bier, in Berlin. The patient had already been operated on by another surgeon, who had taken a very large double pedicled scalp flap, with two pedicles before the ears, more than two inches wide each. The surgeon seems to have combined the pistolhandle scalp flaps of Lexer, with the double pedicled temporal flaps, introduced by us, which ought, however, to have very small pedicles. Probable he was anxious not to wound the arteries and vessels and preferred to use the old, at that time, still regularly used and recommended, very large pedicles.

To day, our « biological- or artery flap » method is so generally accepted, that hardly ever will large pedicles be taken with the flaps. The narrow pedicles must, nevertheless, contain not only arteries, but also veins and nerves and lymphvessels in the pedicles.

The disadvantages of the results in similar cases, where flaps are used, containing the temporal artery, with very large pedicle, are clear. The strong turning of the pedicles gives occasion to pressure on the vessels by the skin.

This transplanted derme, after the pedicle is quite cut through and replaced on the head, is deprived of a direct arterial circulation and a direct outflow by main veins and lymphvessels. Besides, all the great nerves are cut and the sensibility is completely gone, and also the useful sympathetic innervation. The result is, that the fine structure of higher elements is brought into great danger, and will, for the greater part, starve from inanition, or be poisoned by the products of life, which can not be eliminated by the veins or lymphvessels. The consequence will be atrophy of these higher elements and higher constructed cells.

In a exceptionally good case of this kind, after a very, very long time, parts of the nerves and fine-feeling organs of sensibility, which have been able to survive this most difficult period, will reconnect with the nerves of the underlying tissue, where the flap was applied and a slight sensibility can be re-established after years.

As many higher built cells die, and their products poisoning the surrounding cells, cause still more destruction of cells, the remaining flaps *develop connective tissue* and incline to contraction and scars.

To obtain from the remaining flap, sufficient tissue for the missing underlip, there must be obtainable a lot of superfluous tissue for building the underlip and mouth with the flap ends, because the circulation, after the turning of these flap ends, must be assured, and the circulation is only kept up by the capillar vessels, which can very easily be shut by twisting, all the more as a long wait is necessary before the turning operation can be done, and in the mean time the innerparts of the flaps are scarred. The skin of the scalp is always thick and stiff Alto-

gether the turning operation must be done with greatest care not to cause necrosis of parts. Besides, it must be done gradually, that means, at different times.

After every turning procedure of the flap ends the excess tissue was removed. At the same time, the model of the new constructed lips had to grow more and more naturally. On plate 1 is seen, the patient after the other surgeon had cut through both pedicles and replaced them in their original place, in order to restore somewhat the very big scalp wound, especially near the ear, where it is very unesthetical.

On the plates 1 and 2 is seen the dental apparatus, which holds together the broken underjaw. The underlip was entirely lost.

The next operation could not have been done earlier than 6 weeks after, for danger of necrosis, and only one side could be operated on at one time; and only from 6 to 8 weeks later a new operation could be performed depending on the circulation trouble, that might be expected to occur after the operation.

That we did not meet with great or even small local necrosis in the following operations was due to the exceptionally good circulation, health and strength of the patient, and of the particular care we took to avoid bad consequences.

When we left the Berlin clinic of Prof. Bier the patient was well advanced, as seen on plate 8. Nevertheless, several corrections had still to be made, but, the risk of the last corrections had disappeared, as the flap had got a general and firm contact with the underlying tissue and a sufficient circulation had developed. Such corrections must be done with great economy, because the more the tissue, that is left, the easier the next corrections.

To cut away superfluous tissue afterwards, is very easy. It is more difficult to advance gradually, sacrificing the least tissue possible. It would be very hard if all superfluous tissue had disappeared and the situation still required many corrections, because in that case it might be necessary, to bring new flesh in order to continue the corrections and not to leave a too small mouth, the movement of which

would be restricted and the definite appearance of the face would not be pleasing to the patient and his friends and family.

Unfortunate was all this trouble for the patient and the surgeon, and the loss of time for both, by this large cycle of necessary operations in order to make the best use of the material, which was left by the first mistaken method. We made use of this material for two reasons, the economical one and for our general rule to leave the patient with the greatest possible respect for the past operation, for the previous surgeon and for science in general. We had the disadvantage of the impossibility to obtain quite soft lining, elastic, highly, and finely constructed lips.

How easy, economical, quick, and safe would have been the result with a medium-sized single pedicled temporal flap, with a long very thin pedicle.

It would have been possible for us to take the thin pedicle entirely up in a nearly horizontal cheek incision, which was sewn together directly afterwards. The flap should have been as large and short and of such a form and shape, that it filled at once all the missing parts of the skin.

Such a flap would cover the mouth, which had to be closed before, with the exception of a small hole at the place a the opposite side of the mouth, where the pedicle was located. This opening must be left open for 3 reasons : 1) to be able to cleanse the mouth with an irrigator, using a purifying liquid such as permanganas kalicus; 2) to feed the patient with liquid nourishment; 3) to keep a reserve for breathing, when the nose is filled up.

Before the closing of the mouth had to be done with the surrounding lip rests or the still present, but retracted, tissue of the innermouth, which had to be mobilised and sewn together in such a manner that the mucous membrane is placed inside the mouth, and the wounded side had to be brought in connection with the wounded side of the flap.

Great care must be taken that sufficiently innervated muscles in the soft elastic tissue are brought to the place of the future lips.

In cases where much mucous tissue is destroyed or scarred, a cheek skin muscle flap must be taken, which can be placed with its epidermical surface inside the mouth. It must give at the same time enough muscular and connective tissue for the future lips. In that case the temporal flap has to be large enough to cover at the same time the secondary defect in this cheek remaining from this cheek flap that is turned to enlarge the inner epithelial covering of the mouth and of the backpart of the cheek flap. Such a cheek flap must be taken from men from the upper hairless cheek part. From women the whole procedure cannot be done, according to this main temporal flap, being hairy, but my method « The rotation of the cheek » should be followed (see n^{rs} 11 and 20 Enumeration of author's publications).

Or from women a ramus anterior temporal flap from the forehead can be taken.

In all these methods the great advantage is, that the covering flap which had to substitute both lips, heals quite flat and remains free of scar tissue. In consequence, good new lips are easily obtained afterwards, as a long incision is made, going to the inner side of the mouth, forming the new mouth.

The edges of the mucous tissue are then, of course, sutured together with the edges of the covering skin flap, in order to form natural lips. We say « natural » because the skin flap is much more rigid and stiff than the inner mucous tissue, especially if the main temporalis flap, from the thick and stiff scalp is used.

In consequence, the mucous edges will be torn and turned outward and produce the natural ectropion of both lips, always providing that sufficient material is present in that place.

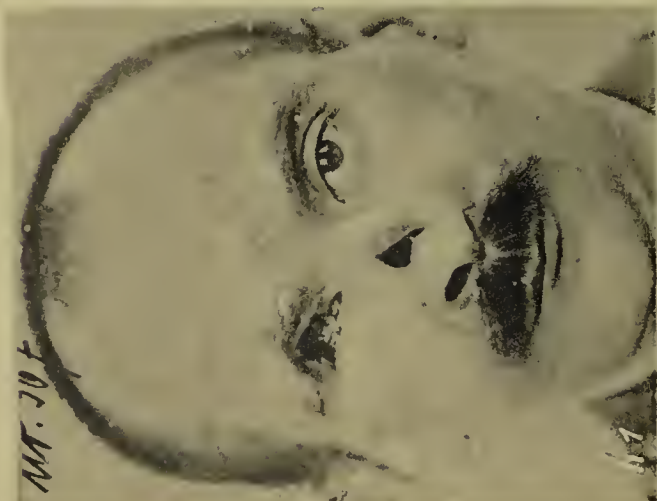
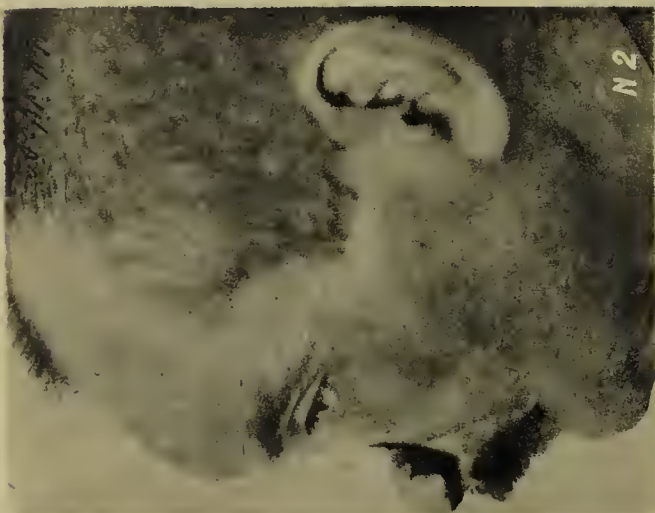
Only the difficult small operation will remain, for correcting the opening, which was left at the first operation.

3. RESTORATION OF EYEBROW AND EYELASHES.

General Observations and Technique.

To make an eyebrow from a temporal flap, it is necessary to bring into the desired position on the brow a piece of hairy skin from the head, as large at least as the other eyebrow, if present. This new eyebrow will contain many more hairs than a normal one, and at its periphery the hairs will be too close together and individually too strong, for in the normal eyebrow the hairs are weaker at the periphery than at the centre, and the edges of the brow appear softer in consequence. As every eyebrow has its own peculiarities and as each must match the one on the opposite side, if it be present, the making of them requires special study. Some weeks after the new brow is healed, attempts can be made to make it as nearly as possible match the opposite eyebrow by removing certain hair roots by cutting them out, or, if only a few are to be removed, by electrolysis. In general a good result is obtained by taking a small border of roots away, and in their place the hair will grow again less numerous and softer in quality. These points are of special value in cases where a cosmetically good result is of importance, for example, in young women, in whom the loss of an eyebrow may be the only defect in the face. It must be remembered that a defect in the beauty of a young woman is at least as serious to her as a very grave mutilation is to a man. The same rules apply to the making of eyelashes; it is not possible to make at one step an eyelid from a pedicled temporal flap with as few hairs as eyelids have ordinarily. After the healing of the lid, not only hairs, but pieces of the flap itself must be removed so that the hairs are few in number and equal in quality, and in a single row.

In both cases, whether eyebrows or eyelids, the flaps have long pedicles, and are often brought through tunnels in the skin, in order to cause no scars on the temples, especially in cosmetic cases such as are referred to above.



Plates N 1-5.

Patient N.

Berlin.

See page 70.

Patient N lost his right eye, a great part of his nose with its skeleton and the right arcus superorbitalis with eyebrow and upper eyelid.

The restoration of the nose with a frontalis flap is described p. 108 and the eyebrow and eyelid were formed with the help of a temporal flap (main artery) as is easy to examine on the plates N. 1, 3, 4 and 5. The hair, which formed the new eyebrow and eyelash was not yet developed when the plates N. 4 and 5 were taken, neither had the corrections been made to give the right model to the eyelid.

The scar going from the ear to the neck was not operated on. The pedicle of the temporal flap remained with it and brought good sensibility and good nourishment to the flap and the hair growth did not suffer after being transplanted.

In exceptional cases the frontal flap can be used well for women to reconstruct the upperlip or parts of it, on account of their skin being hairless. This can only be done in case of the patient having a high forehead, and besides, the flap must be taken obliquely, to the upperside of the forehead, so that it is long enough to reach the upperlip, the secondary defect being easily covered by the dressing of the hair. Especially when there are also to be done to the same patient reparations of the nose or eyelids the frontal flap is of great value.

4. COMPLEX RESTORATIONS.

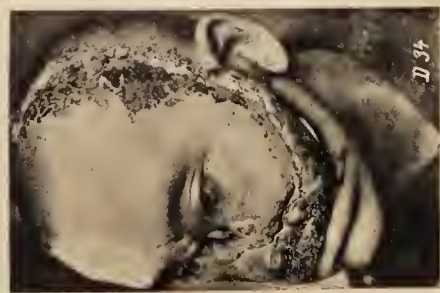
Plates C 1-5 and C 27-30.

Patient R.

See page 73.

The principal objective in this case was to fill a large hole between the nose and cheek which opened directly into the exposed antrum highmori and into the inner part of the nose. This defect was entirely surrounded by scar tissue. A long pedicled flap, the traces of which can be distinctly seen on Plates C 1-4, was brought from the top of the head to the defect and provided material enough to cover it and to make a new covering for the upper lip. The flap was large enough for these two purposes. In the following operations this flap had to be divided into two portions, one of which was to form the upper lip, and the other to form the nostril and part of the cheek. From the latter portion the hair roots had to be removed. At the place where the new nostril was to be made the flap was folded double. Plates C 2-5 & C 27-30 show how this flap was gradually divided into two and how each portion was modelled more and more to serve its final purpose.





Plates D 31-42.

Patient T.

See pages 74, 75, 76.

Plates D 31-32 show the patient when brought to us for treatment. As is seen the upper lip is destroyed and the mucous membrane is turned up meeting the nostril. Plates D 33-34 show how a temporal flap is prepared, large enough to serve the purpose of restoring the lip and subsequently the nose as well. First the lip is filled in. Six weeks later the pedicle is cut and the proximal end of the flap, nourished by the attached distant end, is turned upwards until it reaches the glabella. To it is sewn a small frontal flap, which is applied to it throughout its length, so that the frontal flap lies alongside the nose defect and to the right of it, with the temporal flap outside it. The flaps are stitched flat and sewn together all round their edges, forming a flattened pocket, as is best seen in Plate 37 A. At the left of the nose defect the border is split by a cut separating the skin of the cheek from the mucous membrane of the inner nose. A corresponding cut is made along the line of suture of the frontal and temporal flaps, the edge of the frontal flap is sewn to the nose edge, and the edge of the temporal flap sewn to the cheek edge of the new cut. At the same time the temporal flap is divided into two portions, one to form the new lip covering, cut as exact in size and shape as possible, and the other is used for the nose. The pointed end, of it is sewn as a septum for the nose in the upper middle part of the upper lip. (See Plate D 38.)

After six weeks the right side is treated in the same way so that on that side also the borders of temporal and frontal flaps join the cheek and nose border respectively of the cut edge of the defect, and the nose is thus completely closed except for the nostrils. (See Plate D 39.) The operations made concurrently with this to correct the left eyelids are not dealt with here, nor those in which the above mentioned flaps are stretched and rib cartilage introduced and these tissues modelled to form a more normal nose. In the middle line of the upper lip hair roots were removed to give a more normal appearance, and a depression made in this line by the removal of tissue to correspond with the natural medium vertical depression in the upper lip.

Plates B 1-20.

Patient P.

Berlin. Clinic Bier.

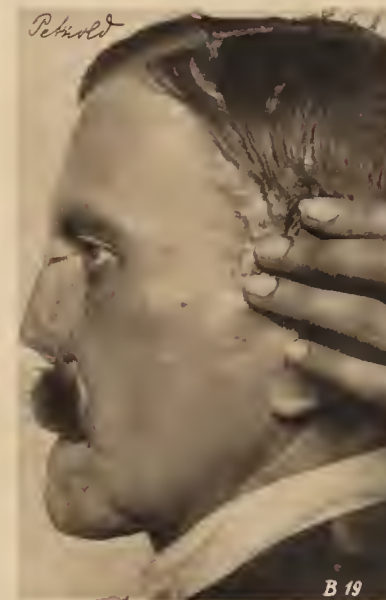
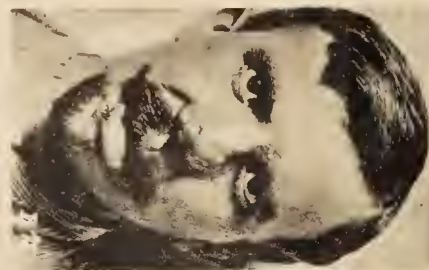
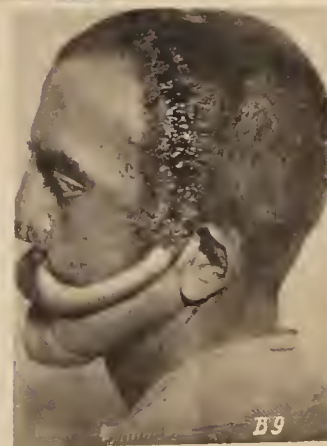
1918-1921.

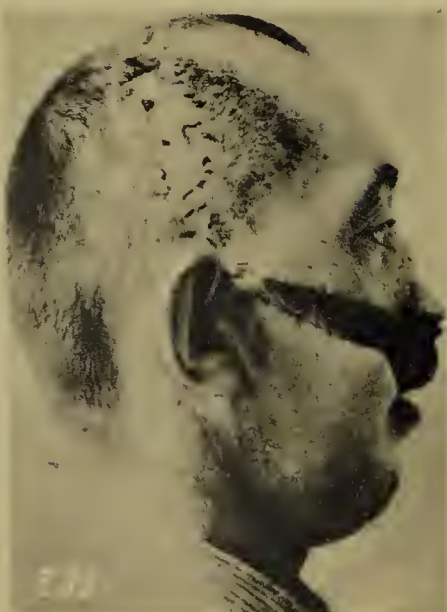
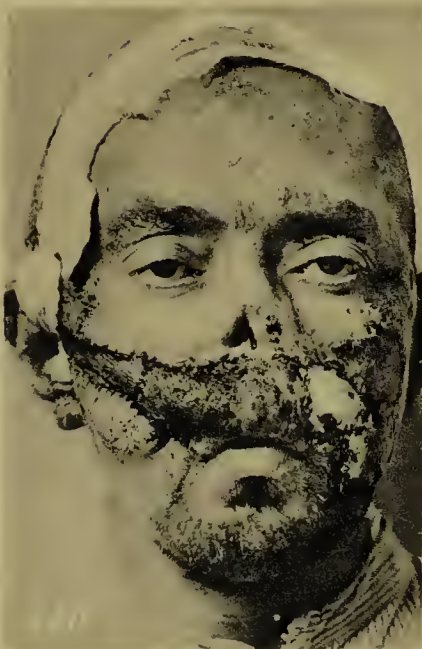
See pages 79, 80, 81.

Plate B 1 shows patient before he was wounded. Plates B 2-8 are photographs, which were taken while undergoing treatment before coming to us.

In a manner similar to the last case described a temporal flap was cut. Plates B 9 & 9a show the region from which the flap was taken. From this we first restored the upper lip after removing the existing scarred and hairless tissue of the region. Six weeks later the pedicle was cut and the proximal end of the flap was turned round and brought below the mouth as lowerlip, the scarred, hairless tissue of this region having previously been removed. This is shown in Plates B 10 & 11. At first a «feeding bridge» between the two parts of the flap was left at the left corner of the mouth between the upper and lowerlip, but when the new lowerlip was quite healed this «bridge» was cut, and the left side of the mouth was constructed in the manner we described elsewhere.

Plates B 12-20 show how the mouth was modelled until it acquired a perfectly normal form. In the meantime the nose was transformed and only the flaps already used in the operations made, before the patient came to us, were used. This is a more difficult operation than restoring a nose in the first instance with a new flap, or flaps, but it gives the patient more confidence in surgery during the long treatments necessary, than when the results of previous operations are discarded.





Plates E 76-83.

Patient G.

Berlin. Clinic Bier.

1920-1921.

See page 82.

This patient lost his nose and the skin of the upper lip owing to lupus. A large scar with no hair growth covered the greatly reduced upper lip, and the patient wore an artificial nose which was held on with spectacles, as shown in Plate E 77. The extent of the operation was reduced to the minimum as the patient was also tuberculous. We therefore decided to make a new upper lip from a temporal flap, but not to sacrifice the scar tissue which covered the lip, but to use this in conjunction with a small quantity of adjoining lip tissue as a pedicled flap to complete the nose. This small flap had a pedicle on the opposite side from which the temporal flap arose. Plates E 76-78 show the patient before we operated upon him. Plate E 79 shows the condition during the first stage, when the existing lip covering was cut off till it reached the pedicle on the left side, and the defect thus formed was repaired by a temporal flap. The lip flap which was to form the nose had a Thiersch graft attached to its wounded surface by means of an « epithelial inlay ». (See Nos 5, 11, etc. List of publications of author.) Plate E 80 shows the flap with the Thiersch graft healed to its under-surface — which is the surface seen in the plate. Plate E 81 shows the flap sewn to what remains of the nose. Plate E 82 shows a further stage and Plate E 83 shows how the portion of the temporal flap which was not required was returned to the head. In this case the temporal flap was cut large enough to form the nose as well as the upper lip, in case the lip flap suffered necrosis, and this risk was great as the tissue was heavily scarred.

«REVIVING AND PURIFYING WOUNDS BY INSERTING
THEM IN FRESH WOUNDS»
OR HERE «CLEANING AND HEALING OF BONE-SORES
BY BIOLOGICAL- OR ARTERY FLAPS».

See page 85, plates 1, 2, 3.

Patient S. A. at the beginning of the Great War got a superficial skull injury by a grenade. The bone was not broken and there were not signs that the tabula interna was splintered. Also the X-Ray photos, which were very clear, proved this opinion. A piece, as large as a cent, of the tabula externa was missing and also a larger piece of the periost around it was missing, thereby showing the uncovered bone (as is seen on plate 1). All around was a scar of the scalp, diminishing gradually and changing into normal scalp tissue. The scar-tissue was extremely hard, thus preventing the normal circulation, which had in fact entirely ceased at the outside edge surrounding the wound. The consequence of this situation was that during months the wound was stationary and the healing did not progress. We reflected that if we did not obtain it healed, the danger of infection would remain and eventually could cause meningitis. In every case a spontaneous healing was impossible.

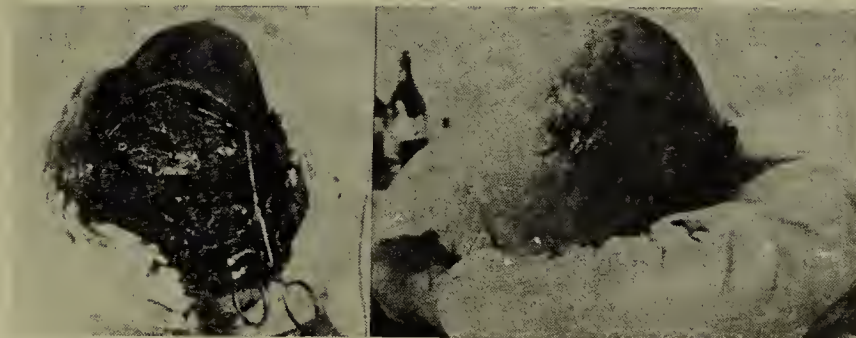
We decided to operate on the patient and cut away entirely the scar-tissue in such a manner that also the microscopically invisible surrounding parts of it were radically removed. We gave the incisions such a direction and form (as is shown on Plate II) that the resulting wound was almost oval of form, going straight across the head, beginning and ending above the ears. This «oval» was pointed at both ends in order to facilitate the covering. Then we chiselled away the complete tabula externa of the skull-bone as far as the periost covering was missing. After which, an incision through the skin was given parallel to the back wound edge, at three inches distance from it. This incision found and crossed the ends of the edges just on the temporal artery and it was as deep as the periost. The scalp part between this incision and the edge of the wound was loosened from the underlying tissue in such a manner that it became free and mobile and contained in the half near the edge at the front side, the periost, and in the other half to the neck only the scalp. At both ends were biological pedicles.

This flap now was turned forewards like a vizor to cover completely the wound, and leaving a large secondary defect behind it, above the neck. This defect was then diminished in size as much as possible by sewing the edges at the pointed ends, even by stretching them. As

the scalp skin is very hard and stiff, the back edge of the replaced flap, now being too long, did not suit itself to the skull bone and gaped in the middle part; therefore, by means of a sharp one-tooth hook the middle was pulled up as much as possible, bringing nearer together by this manipulation the two halves, so that it became possible to sew them together near the hook with three stitches. The result then was that the length of the edge was so far diminished that it was pressed everywhere against the skull. And at the same time the secondary defect was greatly diminished in size.

Then, in the same sitting, the secondary defect was covered with a freely transplanted skin flap of the same form but one third larger in every direction and taken from the Pubital hairy region. The secondary defect of the latter could easily be shut by sewing the edges together.

The healing of the vizor flap, containing a rich circulation because of the presence of the artery temporalis and veins and lymphvessels, and a good innervation, was concluded without any extraordinary occurrences; and this flap healed and purified completely, in a short time, the skull wound, which without any doubt had contained many infected parts. The freely transplanted Pubis skin did not heal completely, but left a small granulating wound, which was covered and healed by a small « Thiersch » flap.



Nº 2.

Nº 1.



Nº 3.

Conclusion :

The principle of the treatment is that even infected wounds, under certain circumstances, can be best healed either by placing on them very well nourished fresh wound tissue or by placing the wound itself, if it is on a limb, on such parts of the body or another limb, to which it can be brought and fastened, and where it finds a good circulation to clean, purify and heal it.

In several cases we had to treat large fresh wounds of the arm and biceps brachii and wounds of the hand. Contrary to the usual treatment our method is to sew these fresh wounds into incisions of the body or limbs, risking infection, but on the other hand taking away the danger that very important members, or parts of them, lose their mobility by scarring during the treatment of open wounds.

We introduced this principle in 1916 and call it « Reviving- and Purifying wounds by inserting them in fresh wounds » and have published many articles about it: in German periodicals as « Ein-nähung ».

b) RAMUS ANTERIOR.

Special technique.

Flaps from the territory of the *ramus anterior* of the Temporal Artery are used when it is necessary that the flaps shall not be hairy. These flaps take their pedicle at the point where the ramus arises, or they take the main artery as pedicle; in the latter case the main artery is cut above the point where the ramus arises. The latter method is more certain, as the main artery then passes all its blood into the flap and the main vein has only to bring the blood from the branch vein. In addition it is usually better to have the turning point of the pedicle at the cheek bone than higher up, especially when the defects to be treated are situated lower in the face.

The secondary defects of the *ramus anterior* may not have their edges drawn too tightly together or the symmetry of the forehead would be disturbed, one eyebrow being raised higher than the other. Therefore the Thiersch graft must be nearly as large as the flap which has been taken. Owing to the fact that a Thiersch graft is often too conspicuous on the forehead, thicker grafts can be used and tend to show less markedly. In the clinic of Professor Bier, in Berlin, we studied with him the result of using grafts thicker than the usual Thiersch graft, and grafts, each of which gradually increased in thickness were used until the graft included the entire thickness of the skin. A still better cosmetic result is obtained when the defect is covered by means of an « epithelial inlay », according to the method we suggested in 1917. (See No 5, etc., of enumeration of the publications of Dr. J. F. S. Esser.)

The ramus anterior flap has the advantage, that no unseemly hair will grow on its surface, and it can be put around the nose, eyes, and the upperpart of the cheeks of men, and the complete face and neck of women.

The disadvantage of this flap is that it leaves a mark on the forehead, and as already said, that the secondary defect can easily give occasion to the lifting up of one eyebrow, if no special care is taken, especially if the flap is taken from the lower part of the forehead.

Generally for ladies it is preferable to take it from the upperpart of the forehead, as the scar can be covered by the dressing of the hair.

In cases where the whole skin of the forehead can be used and turned downwards on two pedicles, like a visor, there is a great advantage, because the limits of the secondary defect can be hidden along the natural line of eyebrows and hairgrowth and the defect can be covered at once with a « Thiersch »- or « Krause »-flap, taken from the upper-inner-frontpart of the thigh, in using a stentsmodel, as described in our publications concerning « Epithel-Einlage » and « Epithelial-Inlay » (numbers 5, 11, 34, 47, 61, 70, 71, 72, 75 of list of the publications of author).

This epithelial inlay can be made, before the great flap is taken away or even cut. The stentsmodel has to be taken from a great pocket. To make this pocket, we make an incision along the line of the hairgrowth, and with a blunt instrument (elevator or shut cupper scissors) we loosen the whole skin of the forehead in a downward movement, in order to avoid injuries of arteries. Afterwards the stents is put in this pocket to make an imprint. When this model has become firm and resisting, it is removed, and enveloped with skin tissue and replaced in the pocket, and the incision is re sewn together under pression, to avoid moisture between the transplanted skin and the wound.

The forehead is extremely well furnished by blood and lymph-vessels, which have a rich communication not only by capilars but even vessels of rather large size.

For that reason it is possible to take the complete forehead skin as flap only pedicled at both sides or even only at one side with the ramus anterior artery and the accompanying lymphvessels, veins and nerves.

The great advantage of such an operation in cases in which large hairless defects of the face are to be reconstructed, consists in the facility restoring the secondary defect that is almost entirely limited by natural lines (hairy edge of scalp and eyebrows).

An « epithelial inlay » can cover at once, by using a large « Thiersch » flap from the upper inner front part of the thigh, the secondary defect which heals in such a manner quickly and perfectly.

Especially for women and girls the ramus anterior flap is of great interest on account of the absence of hair and for the help they can bring by their coiffure to cover parts of the forehead in cases, that the secondary defects show themselves too much.

In the case of men these flaps are useful if they are extended over the scalp.

We prefer to use them especially for the reconstruction of upper-lips in cases, where an insufficient quantity of mucous membrane remains for building the upper or even also the lowerlip.

The flap must contain a scalp part for restitution of the lipskin and in connection with it a smaller or larger hairless forehead skin piece for one or both lips. In the last case the flap covers the mouth (leaving a small hole at one side for nourishment, cleaning and breathing). Afterwards the new mouth is cut dividing the flap into two lips, more or less furnished with skin according to the quantity of missing mucous membrane.

CASES OF TEMPORAL FLAPS.
RAMUS ANTERIOR.

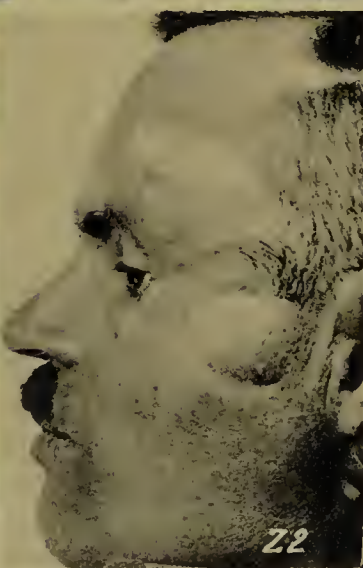
Plates F 1-3.

Patient F.

Berlin. Clinic Krückmann.

See page 91.

This patient had lost his left eye and the left upper eyelid was destroyed. In this case an « epithelial inlay » was made, the size of an eyelid, over the outer half of the eyebrow, as shown in Plate F 1. This was done in the following manner. The cavity of the defect was cleared and a « stents » model was made of it. The « stents », which hardens in ten minutes was taken out of the cavity and wrapped in a thin Thiersch graft, taken from the inside of the upper arm, the epidermic surface being placed in contact with the model and the cut surface to the outside. The covered « stents » is pushed into the cavity in a manner to be compared with the pushing of a finger into a glove, so that the graft is pressed firmly to the model. It does not matter if there are folds in the graft, but the cut side of the cavity must only come into contact with the cut side of the graft. (This method of « epithelial inlay » is described in the numbers 5, 11, etc., of the Enumeration of the publications of Dr. J. F. S. Esser.) A fortnight later the condition shown in Plate F 1 is reached. The « stents » has been removed and the « epithelial inlay » is healed to every part of the pocket, giving a flattened pocket lined throughout with epithelium. A cut round the periphery of this flattened pocket was made, which separated the upper flap from the lower. This upper half having both surfaces covered with epithelium is now suitable for use as an eyelid, and is removed as a ramus anterior flap to reconstruct a new eyelid. (See Plates F 2 & F 3.) The secondary defect above the eyebrow was already covered with the epithelium of the inlay except for the circle where the upper part of the flattened pocket was cut from the lower at the periphery. The roof cut of the pedicle was sutured after the removal of the pedicle downwards. The pedicle itself



was passed through a channel made by undermining the tissue from the end of the roof cut to the point, where the outer side of the eyelid was to be.

Plates B 1-4.

Patient B.

Berlin. Clinic Krückmann.

1920.

See page 91.

Patient B had lost the left eye, the lower eyelid and a greater part of the cheek bone of the left side. Plate B 1 shows the patient as he was when he came under our treatment wearing an artificial eye. Plate B 2 shows how a long and massive ramus anterior flap was brought into position to restore the scar tissue of the upper cheek and to serve as a support for a piece of existing upper lid which was to be stretched and brought below the eye to serve as lower lid. This was accomplished by freeing the required portion of the already distended upper lid from the surrounding tissue and stretching it below the eye till its end reached the inner angle of the eye, when it was sewn to the flap which had been brought below it, as above, and to the remains of the conjunctival pocket. Later the eye orifice was elongated and made pointed at the outer side by cutting through the curve of the stretched lid tissue, making an angle which was to mark the juncture of the upper lid and the new lower lid; this angle was made to correspond as nearly as possible to that of the opposite eye. Later on rib cartilages were placed under the flap to replace the cheek bone as is shown in Plate B 4. The result was very successful.

Plates Z 1-2.

Patient Z.

Berlin. Clinic Krückmann.

1919.

See page 91.

Patient Z had lost the lower lid and part of the upper lid of the left eye. In a manner similar to that described in the case of Patient F above, a ramus anterior flap was taken from tissue prepared as before with an « epithelial inlay ». The result of the new eyelids is to be seen in Plate Z 2, as well as the « epithelial inlay » on the forehead, which as time went on became much less noticeable.

Plates N 116-123.

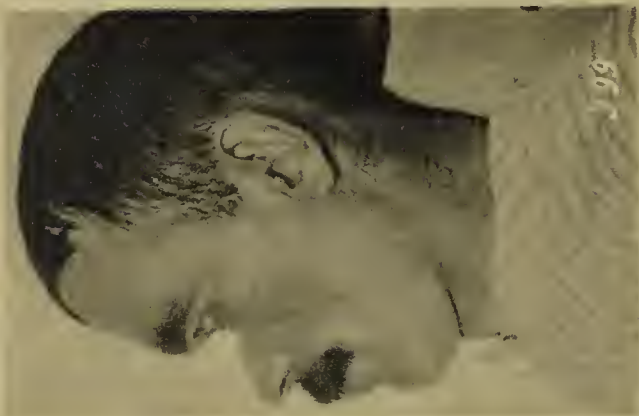
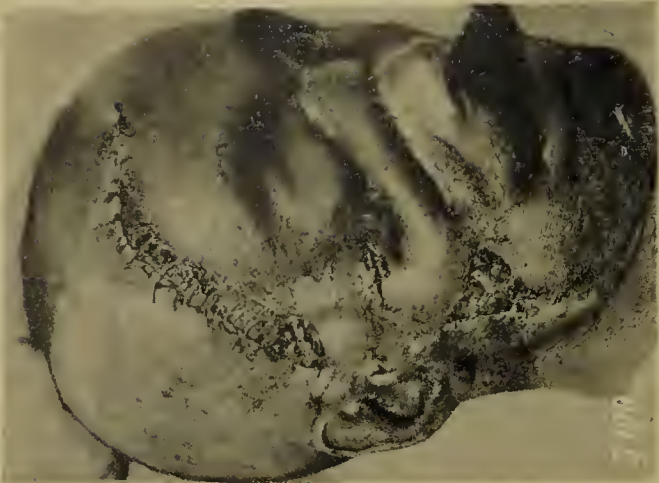
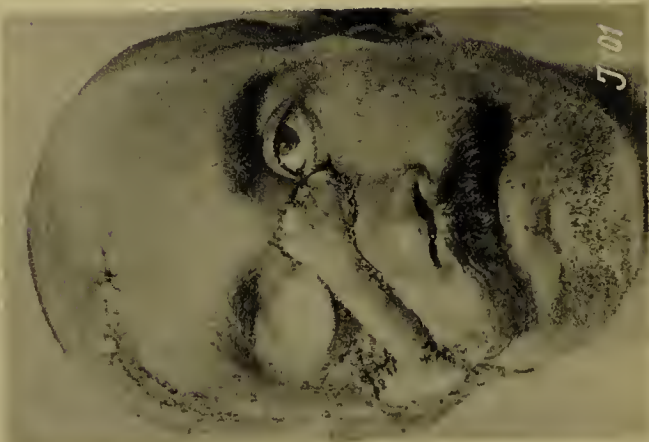
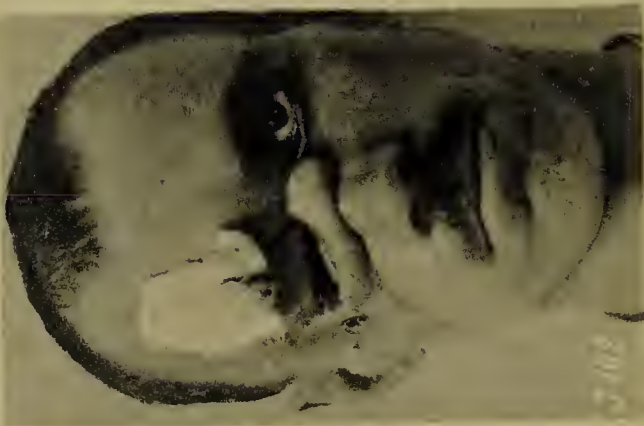
Patient N.

Berlin. Clinic Krückmann.

See page 95.

This patient had lost the eye and both eyelids and a greater part of the cheek bone of the left side, and the tissues of the damaged regions had healed with large scars. (See Plates N 116-117.) Plates N 118-119 show how the « epithelial inlay », prepared as in foregoing cases, has healed, though the « stents » model has not yet been removed, and is seen as a dark patch in the opening of the pocket. Plates N 120-121 show the condition as the ramus anterior flap, consisting of the outer part of the pocket, was placed in the defect and healed there. Plates 122-123 show the patient after the first corrective operations.





Plates J 98-103.

Patient M.

Berlin. Clinic Bier.

1917.

See page 96.

This patient had lost his right eye, lower eyelid, a greater part of the cheek bone, upper jawbone, the upper part of the nose and the os ethmoidale. He had already undergone operations for the restoration of these parts, and the whole of the tissues of the region were very much scarred. (See Plates J 98 & 99.) In a manner similar to that described in the preceding cases, an « epithelial inlay » was made on the forehead for the preparation of a future ramus anterior flap, covered on both sides with epithelium. Six weeks later the flap was cut and placed in the defect as shown in Plates J 100-101. The borders of this flap are treated in the same manner as the borders of the flap described in the case of Patient T above (Plates D 31-41), to form a nose. Plates J. 102-103 show further improvements made in subsequent operations.

Plates K 104-106.

Patient F.

Berlin. Clinic Krückmann.

1918-1921.

See page 99.

As a result of a bullet wound the patient had a very severe ectropion of the left lower eyelid and a very marked scar, crossing the cheek from this eyelid to the ear, the cheek bone being destroyed. (See Plates K 104-105.) A large ramus anterior flap was placed in a cut encircling the under eyelid, which cut was continued to a place symmetrical with the outer edge of the opposite eye, and this completely corrected the ectropion. Plate K 106 shows the result of this, and at the same time a method of stitching, that we use in every ectropion operation. In this method the under border of the flap is joined to the cheek border by separate stitches, the ends of which are left long. A single stitch of silk thread enters the upper eyebrow and emerges again at a short distance from where it entered and the two ends are firmly knotted over a hard «bean» of gauze placed between the points of entry and exit of the thread and large enough to keep the two threads apart and to prevent them from tearing the tissue. The ends of the threads are firmly knotted over this «bean». Then the ends of the stitches along the border of the flap and cheek are gathered together and drawn upwards making a fanlike arrangement with apex uppermost. This bundle of threads is then tied firmly together by the two long ends of the threads of the stitch in the brow, in such a manner that the lower lid is drawn upwards during the healing period. To make all quite firm the long ends of the brow stitch are tied to the ends of the other stitches.

Plates L 107-109^a.

Patient B.

1920.

Eye Clinic Mühsam.

See page 99.

Plate L 107 shows an ectropion of the left lower eyelid that had not yielded to treatment at other hands, and had been caused by a large development of scar tissue over the upper part of the cheek. Plates L 108-109a. He was cured by the introduction of a ramus anterior flap, in the manner described in foregoing cases.





Plates S 153-160.

Patient W.

Berlin. Clinic Krückmann.

1921.

See page 100.

This patient had lost both eyes and their lower lids, and the nose except for a bridge of skin of the glabella. (See Plate S 153.) We will not deal with the various operations that were made, except the one involving the use of a ramus anterior flap. This flap was introduced on the left side to make a lower lid suitable to receive an artificial eye. It was prepared with an «epithelial inlay» and used as described for Plates N 116-123 above, as shown in Plates S 154-160.

Plates H 122-126.

Patient H.

Berlin. Military Hospital, Tempelhof.
1922.

See page 103.

The patient had lost his left eye and both eyelids. Scarred skin covered the former orifice of the eye and the surrounding tissues were also destroyed. (See Plates H 122.) First an «epithelial inlay» was made as shown in Plates H 123-125. Plate H 123 shows the pocket opened, with the outer flap lined with epithelium hanging down like a tongue over the region of the left eyebrow. The stents model which had been used is lying on the glabella, for the purpose of the photograph. The pedicle has been prepared in the line shown on the temple. Plate H 124 shows how the flap has been brought to the desired position and already divided into upper and lower lid. Plates H 125-126 show further dispositions and an artificial eye already in position.

Plates J 127-129.

Patient J.

Berlin.

See page 103.

This patient had lost both eyes, and the upper part of the nose and surrounding tissues and skeleton were severely damaged. Large open granulating wounds covered the glabella which was also destroyed. Plate J. 127 shows an «epithelial inlay» on the forehead, made with the object of constructing the lids of the left eye. Plate I 128 shows the temporal flap brought into position to restore both eyelids having epithelial behind by the inlay made before. The lids of the right eye were made from complicated frontal flaps to be described later. The patient did not desire later to have the left eyelid regularised — as the operations that were still to be made, would have been accompanied by great risk and much pain, the risk being due to the nearness of the brain itself to the seat of the operation, and the pain to the presence of neurosis in the deep seated scar tissues. See also page 47 for his other operations.



Plates H 122-126.

Patient H.

Berlin. Military Hospital, Tempelhof.
1922.

See page 103.

The patient had lost his left eye and both eyelids. Scarred skin covered the former orifice of the eye and the surrounding tissues were also destroyed. (See Plates H 122.) First an «epithelial inlay» was made as shown in Plates H 123-125. Plate H 123 shows the pocket opened, with the outer flap lined with epithelium hanging down like a tongue over the region of the left eyebrow. The stents model which had been used is lying on the glabella, for the purpose of the photograph. The pedicle has been prepared in the line shown on the temple. Plate H 124 shows how the flap has been brought to the desired position and already divided into upper and lower lid. Plates H 125-126 show further dispositions and an artificial eye already in position.

Plates J 127-129.

Patient J.

Berlin.

See page 103.

This patient had lost both eyes, and the upper part of the nose and surrounding tissues and skeleton were severely damaged. Large open granulating wounds covered the glabella which was also destroyed. Plate J. 127 shows an «epithelial inlay» on the forehead, made with the object of constructing the lids of the left eye. Plate I 128 shows the temporal flap brought into position to restore both eyelids having epithelial behind by the inlay made before. The lids of the right eye were made from complicated frontal flaps to be described later. The patient did not desire later to have the left eyelid regularised — as the operations that were still to be made, would have been accompanied by great risk and much pain, the risk being due to the nearness of the brain itself to the seat of the operation, and the pain to the presence of neurosis in the deep seated scar tissues. See also page 47 for his other operations.

B. Occipital Flaps.

The *Occipital Flap* is only used in special cases. It consists of a hairy flap of skin from the region behind the ear, and would be easy, considering its nearness and position, to use for operations on the cheek and lower part of the face. But the artery is very fine and for this reason difficult to find, and its course varies very much in different individuals. The secondary defect is more difficult to hide than those of the temporal region, which is important in the case of men, and in men only can the flap be used, owing to its being hairy. We have only used occipital flaps in cases where the temporal artery was mutilated or destroyed. We made good use of a flap from the occipital region in a case of severe cheek burns caused by X-rays, but we have no plates of this operation at our disposition.

C. Frontal Flaps.

GENERAL OBSERVATIONS AND TECHNIQUE.

The frontal artery is the continuation of the facial artery from the point where it crosses the inner border of the eyebrow, from whence it runs vertically upwards to the top of the head, where it terminates, after ramifying with branches from the opposite side and with branches from the ramus anterior. In spite of its small calibre it is generally easy to find as it lies on the bone. Its territory gives extremely useful flaps for the restoration of the hairless parts of the face, and without leaving very disfiguring scars or defects. Single flaps can be taken large enough for combined restorations of lips, nose and eyelids. The technique is not difficult, and in the case of these flaps the economy of the method of using pedicles with no skin is of importance. Further economy of skin can be obtained by preparing flaps beforehand with « epithelial inlays », and this is especially useful in cases where the flaps are to be used for the building of eyelids where the conjunctiva is absent and for noses where there is no inner mucous membrane remaining. In cases where the skeleton parts either surrounding the eye, or of the interior of the nose, are missing, these can be provided for by grafts of rib cartilage placed under the flap and allowed to heal before the flap is cut, in such a position that when the flap is turned to fill in the deficiency the cartilage will come to lie in the correct position. In cases where no « epithelial inlay » precedes the cutting of the flap, the secondary defects may have their edges sewn together, often under great tension, and drawn together across a distance of anything up to 5 cms. In more extreme cases the scar is corrected a few months later when the tension has ceased. In cases where there is an « epithelial inlay » introduced, the circular wound which arises from the cutting of the flap is closed by suturing the two borders together, any irregularities and projecting pieces of tissue first being removed. In cases where nearly the whole, or a very great part, of the forehead is required for the flap it is better to take the whole forehead, cutting symmetrically along the lines of hair and eyebrows, and to heal the defect with one large graft under a « stents » model.

With regard to technique in cutting frontal flaps, the general rules given above can be followed. The main point of special importance for the flap is that the pedicle must not be lower than the eyebrow, for below this level the artery lies often in a groove in the bone (arcus supra orbitalis), and difficulties would arise in turning it. The pedicle can, however, be taken from any point higher up. The course of the artery must be very carefully determined, and this is not always easy owing to the small calibre of the artery and the thickness of the skin of the glabella.

CASES OF FRONTAL FLAPS.

Restoration of lip or nose.

Plates 1-6.

Patient J. K.

Amsterdam. Centr. Isr. Ziekenverpleg.
1932.

See page 109.

I shall present a case which is a very good example of the building of quite a new upperlip with a biological frontal flap as the circumstances were of the most unfavorable and difficult.

The patient J. K. was 9 years old and was born with a hare-lip just times before with the result as is shown on Plate 1 and 2 that means that the upperlip was quite destructed and the place of it was occupied as her sister in Dutch East-India (Java). She had been operated many

by one large scar, even extending untill wide in the right cheek.

I must declare on the profit of the surgeons who operated on her that she and her sister who showed the same bad result inclined both very much to bad healing and producing big scars and keloids.

This was a special reason for me not to try of making a new lip lip from the surrounding tissue.

They are coloured people and I remarked in operating over a hundred cases of coloured persons in the tropics that they incline much more tot keloid than white people.

The Plates 3 and 4 show the girl after the taking away of all the scar tissue of the upperlip and replacing this by a frontal flap as I did on other patients severl times with a striking good result.

The profit of this method is also that one can take the flap as large and of any form as may be desired. The scar on the forehad had in such cases to be taken quite close to the hairgrowth and on men and boys it should be taken even quite form the haired scalp, using either frontal flap or temporal flap. In all these cases even if the scar at the forehead should be ugly it can be covered easily by brushing the hair over it.

The Plates 5 and 6 show the patient after the first retouch as she had to leave me being only for a short visit to undergo a treatment of mine, in Europe.

The great inlcination of the girl for keloid was a reason the more not to repeat to quickly the correcting operations as the keloid has to be treated during the intervals with radium or X rays. We will not develop here the correcting treatment as the reason for which I write this article is only to prove what can be done with frontal flaps better than with other methods in special cases.

Considering how visible is already the scar of the simple incision for taking the very thin pedicle of vessels and nerves, without any skin we can imagine how disfiguring should have been an operation for making quite a new upperlip from other parts of the face. These scar-keloids could still be removed rather easily and the later corrections should have been only with great risk if they had been done to early after that the 6th fotograph had been made.

1



2



3



4

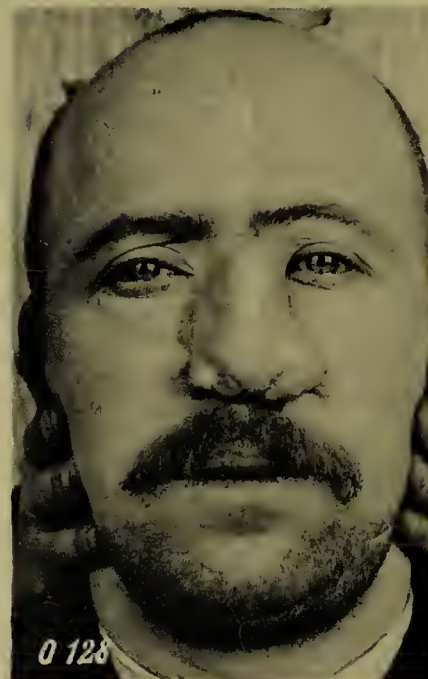
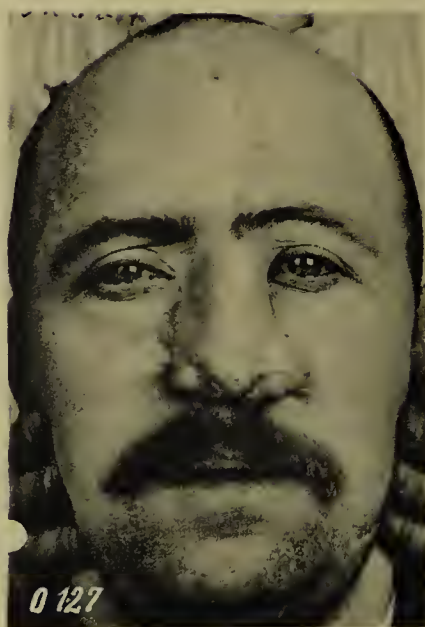
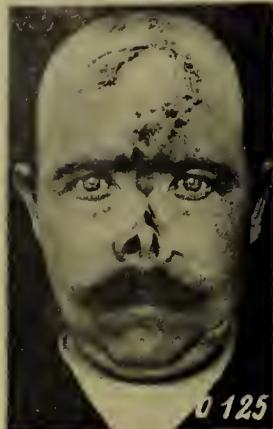


5



6





a. *Restoration of Nose.*

Plates O 124-130.

Patient R.

Berlin. Military Hospital, Tempelhof.

1922.

See page 110.

Patient R had lost the nose except for the right nostril, the skin septum and a small piece of the left nostril, which were cicatrized in a vertical direction. Plates O 124-125 show on the forehead the situation of a graft from a rib cartilage, the size of this graft being suitable to serve as a future bridge for the nose. In 1914 and afterwards we made very many free transplantations of pieces of rib cartilage and contrary to the usual custom of taking cartilage only from the second rib, we introduced the method of taking it from the rib bow of the seventh and following ribs. Six weeks later a large «epithelial inlay» was placed under the graft between the periostium and the bone. The extent of this inlay is indicated on Plate O 125 and is larger than its apparent extent seen on Plate O 126, for the latter shows the inlay after the cartilage graft had been removed and after the remains of the inlay had been diminished in size and sutured to the forehead. The flap containing the cartilage graft and lined by the inlay epithelium was placed in the defect of the nose and sewn all round its borders as described above in connection with Patient T, Plates D 31-41. After a few corrective operations the nose was perfectly normal in appearance and showed no marks or scars. (See Plates O 129-130.)

Plates K 1-5.

Patient K.

Berlin. Ophthalmological Clinic.

See page 113.

Plate K shows the patient shortly after his war injury. Though he was very severely mutilated and had lost the upperhalf of his right upper jaw, his right eye was left but sunk down about an inch. It was lifted up by us with a free transplanted rib cartilage, but here we will merely treat the restoration of the nose, which was prepared before with a cartilage graft and an « epithelial inlay » as shows the tumor on the forehead on the plates K 2 and 3.

Afterwards the frontal flap with its cartilage and epidermis at the back part was placed in a vertical perforating nose cut and gave a very good result (see plates K 4 and 5).

Plates W 1-3.

Patient Lieutenant W.

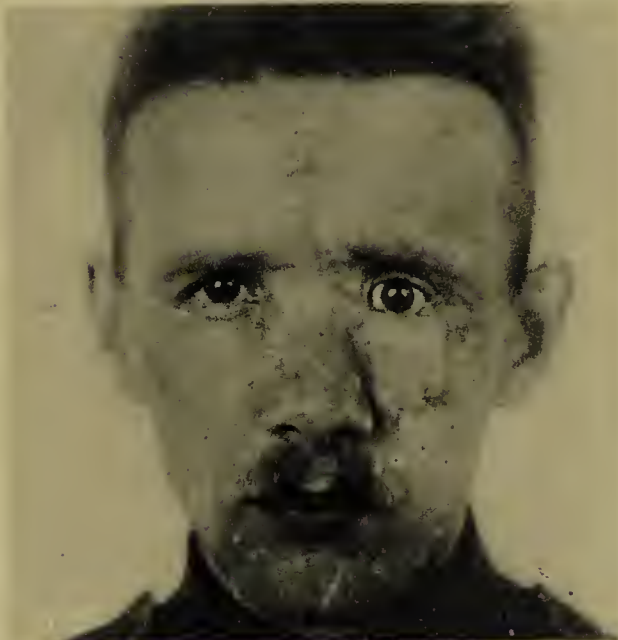
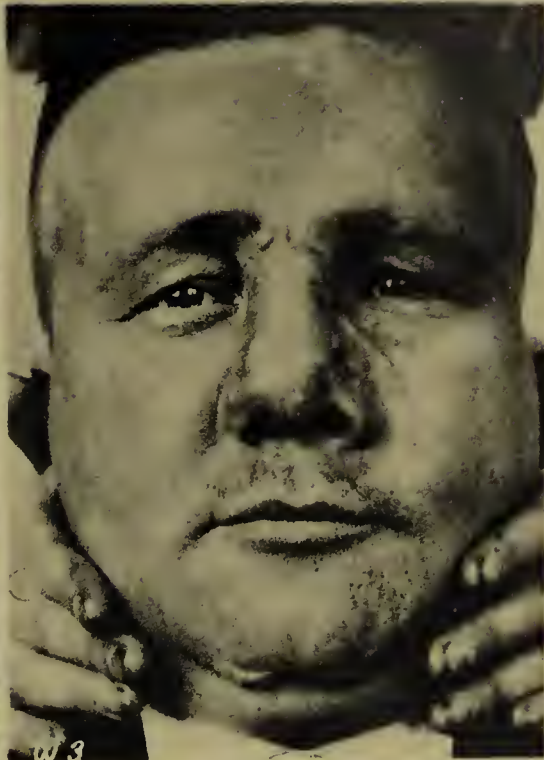
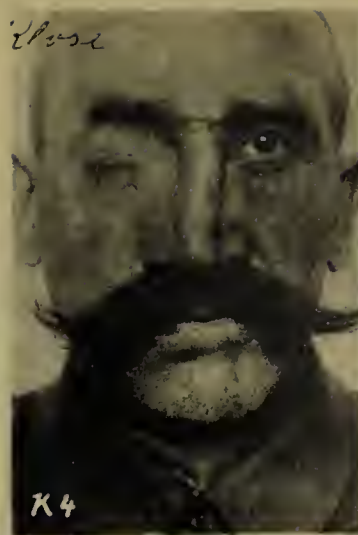
Berlin. War hospital « Luther Lyceum ».

See page 113.

This patient had his nose broken by the fall of his avion.

On the plate W 1 the patient had already a cartilage graft under the skin of the forehead. On the plates W 2 and 3 the frontal flap with cartilage but without « epithelial inlay » was turned and placed in a vertical skin cut, where it healed, while the edges of the cut were undermined and made mobil more than an inch wide.

The result, see plates, was complete and excellent further on.



Plates G 1-3.

Patient G.

Berlin. Ophthalmological Clinic.

See page 114.

Patient had a defect in the left upper part of the nose, and had lost his left under eyelid almost entirely.

A frontal flap repaired at once the mutilations. On Plate G 1 the flap is seen after the first operation. It is best to leave such a condition alone after the first operation as long as practically possible, because the flap retracts itself and tears the upper cheek parts higher up, compensating in this manner the retraction of the scarred cheek.

After the first finishing operation, the Plate G 3 was made, and after a following one, the Plate G 2.

Plates B 1-3.

Patient B.

Breslau.

See page 114.

The destructive operations were here more than necessary, and very urgent, on account of the unprotected right eye, which had a keratitis.

We used a specially long frontal flap, which was very wide at the beginning part, to serve for a new under eyelid, and a large end with which to build the right side of the upper lip, which was missing and replaced by scar tissue.

So the very large frontal flap furnished at once an under eyelid, the right side of the nose, and the right half of the upper lip, after we had cut away completely the long, wide, strong scar that occupied this territory.

Plate B 2 shows the condition after the first, and Plate B 3 after the second operation.

The eye soon healed and grew clearer and clearer.

Plates H 188-198.

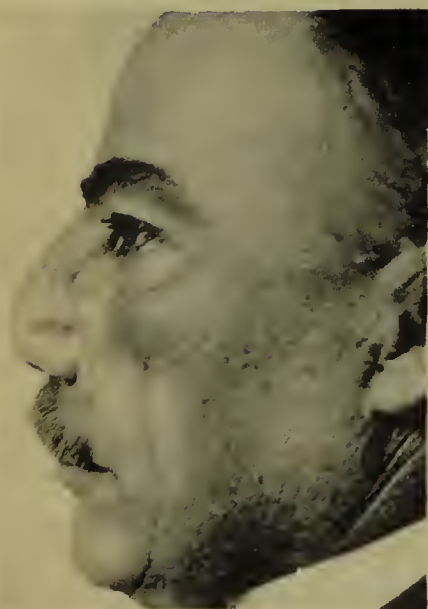
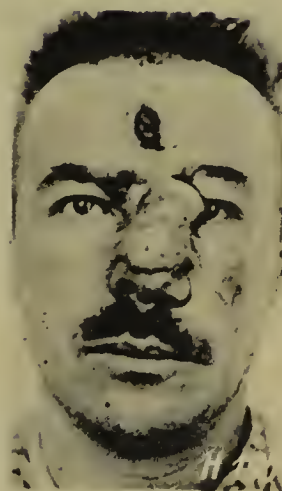
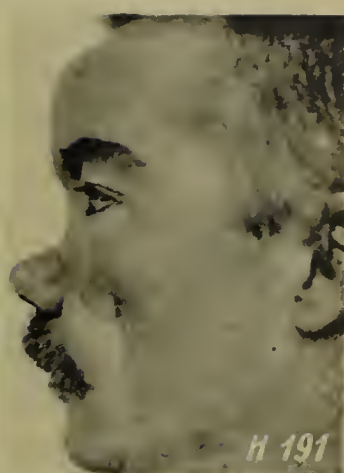
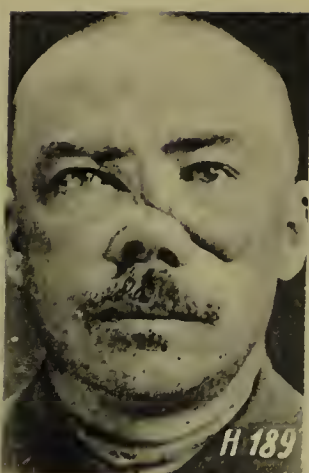
Patient.

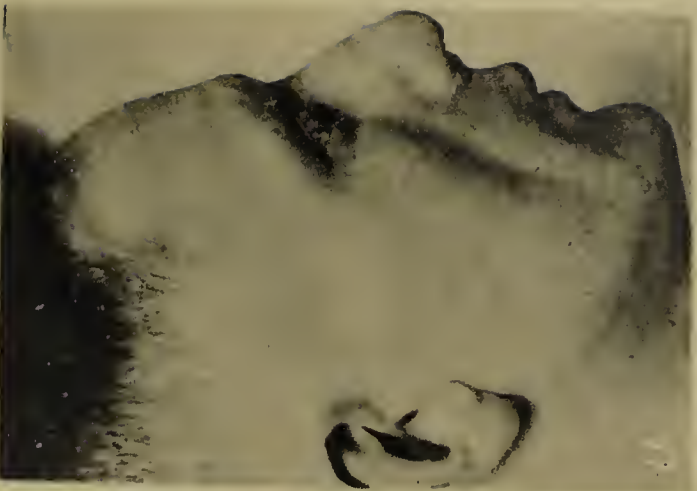
Berlin. Military Hospital, Tempelhof.

1921.

See page 117.

The nose of this patient required partially repairing, the end of the nose and both alae being normal but raised. The other defects of the face and their restoration do not belong to this category of cases and are not dealt with here. Plates H 188-189 show patient as he was when he came under our treatment. Plates H 190-191 show where a cartilage graft and «epithelial inlay» are embedded in the tissue of the forehead in preparation for cutting the frontal flap. Plates H 193-195 show the frontal flap already in the defect of the nose. The scar tissue covering the nose had to be opened and freed to receive the flap. The flap was lined with epithelium but the inlay was not very extensive in this case, though more than would appear from the remains of the inlay seen on the forehead in Plate H 195, for by this time half of the inlay had been diminished and sutured. Plates H 196-198 show the further stages in the restoration of the nose.





*Plates L 1-4.**Patient L.*

Berlin. Technical Academy.
1917.

See page 118

Patient L had a horizontal wound across the face resulting in a deep scar across the left cheek and the destruction of the middle of the nose, and the left ala and septum. (See Plate L 1.) A rib cartilage was grafted in the forehead and when it was healed a frontal flap containing the graft was taken and placed on the nose defect. The operation was similar to those described in the preceding similar cases, and a repetition of the details is unnecessary. Plates L 3-4 show the final result, the patient appearing quite normal and scarcely disfigured at all.

*Plates N 1-5.**Patient N.*

Berlin.

See page 70.

This patient obtained his eyebrow and upper eyelid by a temporal flap, see page 54.

To reconstruct his nose, first a rib cartilage from the rib bow cartilage complex was placed under the skin of the forehead, see Plates Nos. 1-2. (Before we introduced in 1914 the method of taking the pieces of cartilage for free transplantation from this place, where they can be taken in any form, cartilage was seldom used and always taken from the second rib. Visiting Lexer in 1916, we defended strongly the use of cartilages, which he attacked, but afterwards he also agreed to the great advantage of them.)

After at least three weeks, an « epithelial inlay » (see enumeration of the publications of author) could be made behind this cartilage and the periost to cover the future nose flap inside and the frontal bone both at once with skin. On plate N 2 the tumor on the forehead contains both the cartilage and the « epithelial inlay ». On plate N 3 the frontal flap is healed at its future place but not corrected, neither the forehead which

is only covered, protected, dry and clean to be easily corrected afterwards as is shown on plate N 5. The plates N 4 and 5 show the nearly corrected nose.

Plates M 110-115.

Patient O.

Berlin. Blinden Institut.

1919.

See page 121.

Patient O had the whole of the middle part of the face destroyed, including both eyes, both upper jaws and the whole of the nose with the exception of the nostrils. The restorations were made in different ways and at different times, and those of the cheeks and lower eyelids are not dealt with here. The nose was restored by means of a large frontal flap prepared beforehand with a graft of rib cartilage and then with an « epithelial inlay » as described for previous cases. (See Plates M 110-113.) An apparatus for keeping the new nose in position during the healing period had been made by Professor Schröder and is seen on Plates M 112-113. It is an interesting fact that even blind patients have a great interest in their appearance and this patient was always anxious for further treatment until his appearance was made as normal as possible.

Plates L 119-121.

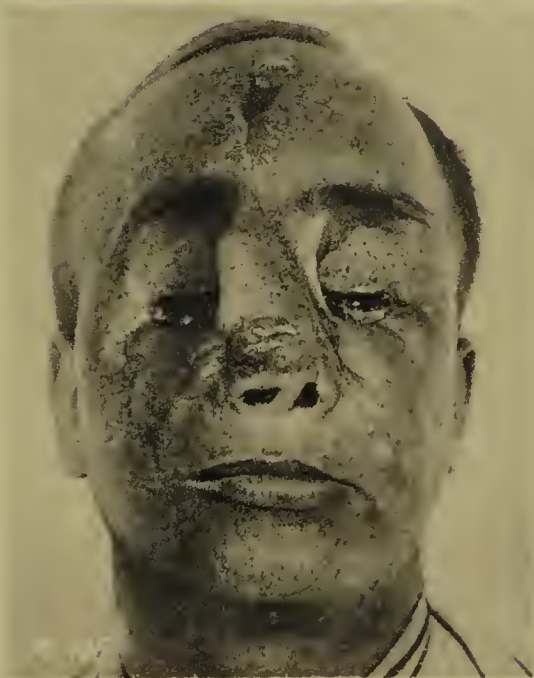
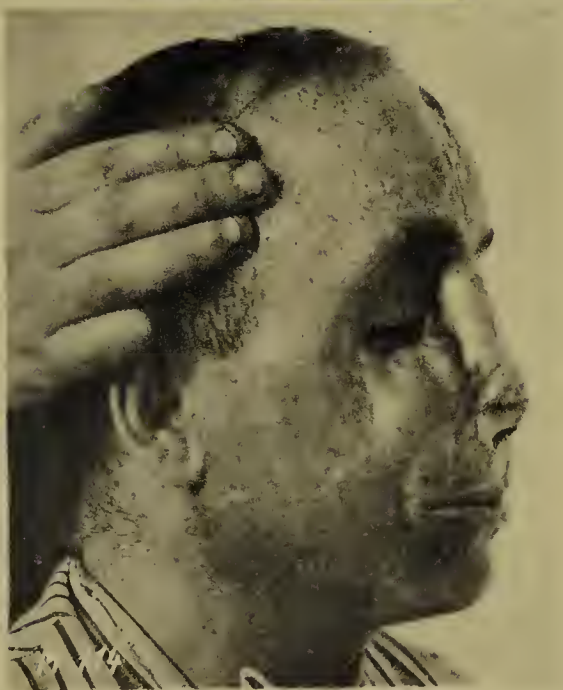
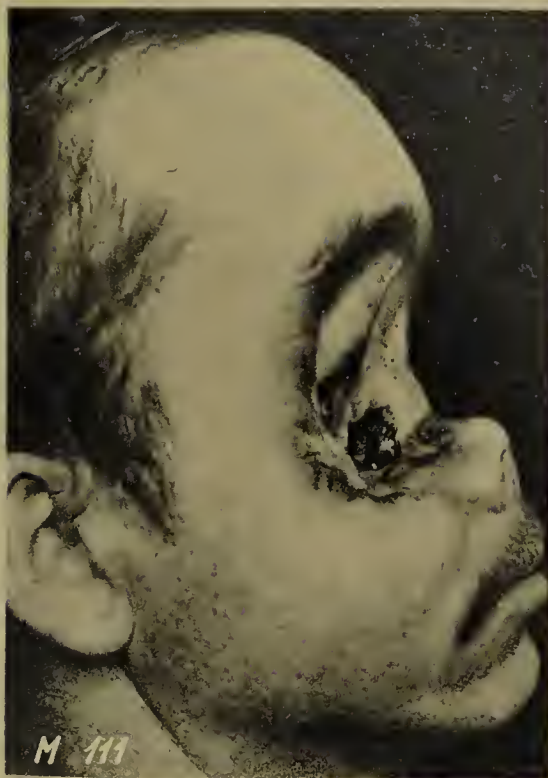
Patient.

Berlin. Military Hospital, Tempelhof.

1922.

See page 103.

This patient had lost the left nostril and the bridge of the nose. (See Plates 119-120.) A small frontal flap, lined with epithelium by means of an « epithelial inlay », was brought into a vertical cut in the scar tissue covering the nose. The result was very good, as shewn on Plate L 121.



b. RESTORATION OF EYELIDS.

Plates A 1-2.

Patient A.

Berlin. Clinic Silex.

1920.

See page 133.

Patient A had lost the inner part of the left lower eyelid. A frontal flap measuring 4 cms in length and 2 cms in width was taken on the left side. Plate A 1 shows the region from which the flap was taken and the flap in position under the eye. Plate A 2 shows the condition after the flap had healed in the new position and the first correction had been made.

Plates R 148-152.

Patient Z.

Berlin. Kriegslazarett Technische Hochschule.

1918.

See page 124.

This patient had lost the left eye, upper jaw, cheek and cheekbone of the left side and the nose. These parts were restored by operations of two kinds, one using an angular flap (to be described later) and the other using a frontal flap. Plate R 148 shows the frontal flap brought into position to cover the very large defect which reached from nose to ear. This flap was prepared beforehand with an «epithelial inlay».

c. COMPLEX RESTORATIONS.

*Plates N 210-220.**Patient N.*

Berlin. Clinic Krückmann.

1921.

See page 125.

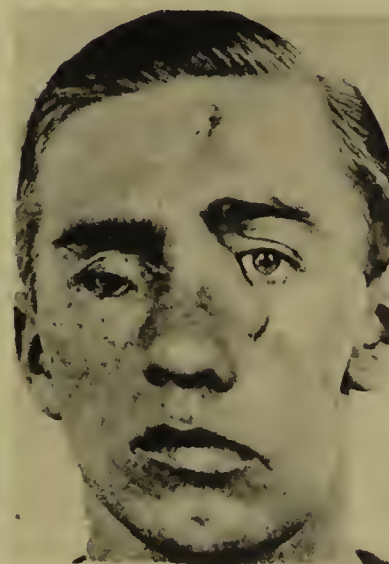
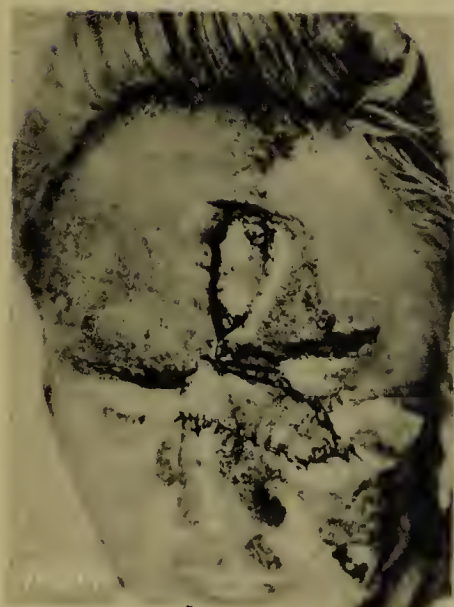
This patient had a large wound perforating the nose and left antrum highmori and destroying the right upper eyelid and *sinus frontalis*, and severely mutilating the left cheek (see Plates 210-211). Only that part of the restoration concerning the use of a frontal flap is dealt with here. This flap was prepared beforehand with an «epithelial inlay», shewn on Plate N 212. Plate N 213 shows very clearly the flap brought over the wound, with the secondary defect completely epithelialised, the dark spots on this epithelium being blood stains which could not be removed until the newly attached skin was less delicate to handle. Plate N 214 shows very clearly the condition before the stitches were removed. Plates N 216-220 show subsequent stages in the restoration of all the damaged parts, the final result being very good.

*Plates V 1-4.**Patient V.*

Berlin. Militär Lazarett, Tempelhof.

See page 118.

This patient had lost the left eye and the cheek, nose and upper jaw on the left side were severely mutilated. Attempts had been made to restore the nose but were inadequate, and Plate V 1 shows the condition of the patient when he came to us for treatment. The nose was built up from a large frontal flap which provided sufficient material not only for the nose but also for restoring the cheek and lower eyelid. Plate V 2 shows the flap in position on the nose with a portion of it in position under the eyelid. Plate V 3 shows further dispositions of the





new tissues and at the stage shown in Plate V 4 the nose appears quite normal.

Plate L 1-7.

Patient L.

See page 126.

This patient had suffered complete destruction of the nose above the nostrils, and the right lower eyelid. A frontal flap was cut to restore both the parts. The flap was made of somewhat unusual shape, having the proximal portion, which was to restore the eyebrow, arising like a bud from the main portion which was to repair the nose. Both parts of this complex flap were prepared beforehand with «epithelial inlays» to give epithelial linings to nose and eyelid, and the portion of the flap destined for the nose restoration was provided also with a rib cartilage graft. Plates L 1 & 2 show the condition of the patient before the operation, and L 5-7 show the condition after the first corrective operations had been made.

Plates K 1-6.

Patient K.

Berlin. Militär Lazarett, Tempelhof.

1922.

See page 126.

These series of plates show very clearly how the rib cartilage grafts and «epithelial inlays» on the forehead are placed. The patient had lost the whole of the right cheek and eye, and the nose was severely mutilated. The patient, before coming to us, had undergone operations, and the right cheek had been restored from a flap from the forehead, where the remains of the secondary defect were very clearly marked (see Plates K 4 & 5). Nevertheless we were able to make a frontal flap from the rest of the forehead, after providing the flap with cartilage graft and «epithelial inlay», as shown on Plate K 1. Plates K 2 & 3 show the flap brought downwards and healed in the defect. The reconstruction of the right ala nasae was the most difficult part of this operation. Plates 5 & 6 show the results obtained.

Plates J 127-129.

Patient J.

Berlin. Blinden Institut.

1921.

See page 103.

An operation similar to the last described was made in the case of the blind patient J, whose right lower eyelid and nose were reconstructed from a frontal flap, with good results. See also page 39 for his other operations.



Plates T 199-202.

Patient W.

Berlin. Blinden Institut.

1921.

See page 130.

An operation similar to the last two described was made to restore the nose and left lower eyelid of patient W. Plate 199 shows the nose destroyed and covered only with scars, with the tip severely mutilated, and the absence of the left lower eyelid. Plate 200 shows clearly the frontal flap in its position and it will be observed how large in extent these flaps may be without necrosis of any part of them, and with a very small pedicle. The flap is separated into two portions, one used for the nose and the other for the eyelid as seen in Plate T 201. Plate T 202 shows the further dispositions of these parts of the flap.

Plates T 203-209.

Patient T.

Berlin. Militär Lazarett, Tempelhof.

See page 130.

Patient T had suffered destruction of the middle part of the face and nose. The tip of the nose and nostrils remained, but these were displaced obliquely and were double the normal size owing to increased circulation in them, especially that of lymph (see Plates T 203-204). We do not deal here with the operations involved in reducing the size of the existing parts of the nose and returning them to their normal position on the face, but will only point out how here again by using a frontal flap the main nose defect was successfully restored, giving another instance which emphasises how useful is this method in repairing such large defects in a practicable and economical way, effecting or disturbing so small an area outside the defect.

Plates P 131-135.

Patient F. A., Persian Professor.

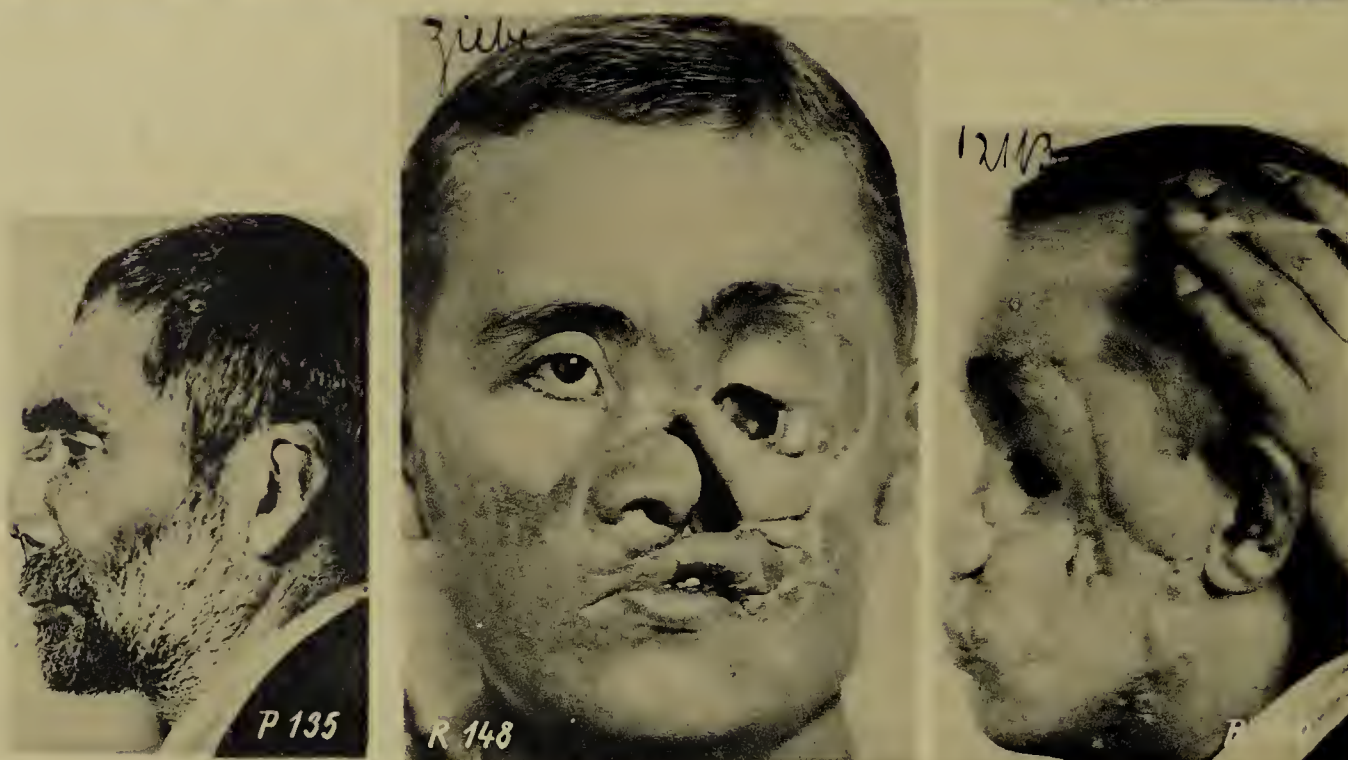
Berlin. Clinic Bier.

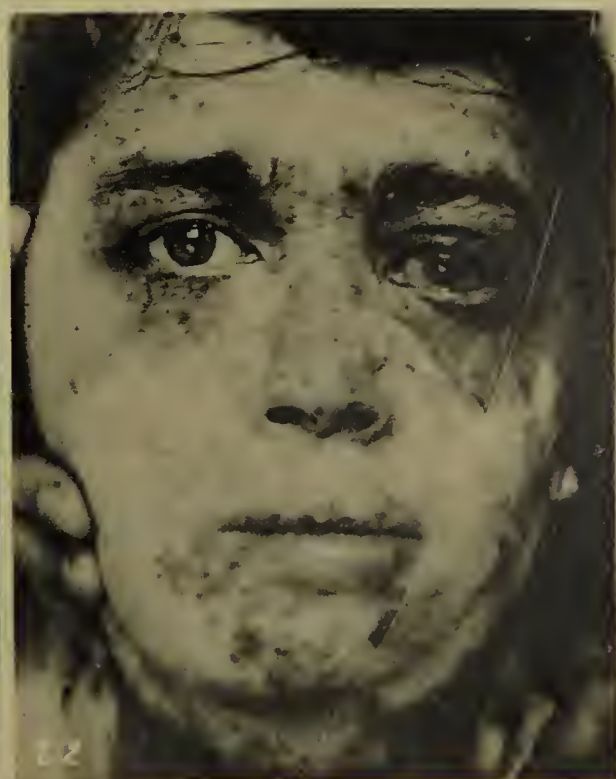
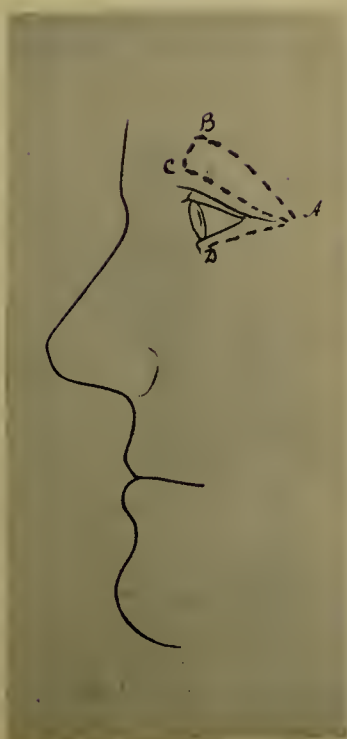
1917.

See page 133.

This patient had lost by cancer a greater part of the right cheek, and the bony surrounding of the right eye. The cancer was not very malignant and only grew very slowly and the patient had only come for treatment after a long period of the disease. (See Plates P 131-132.)

The patient had undergone other plastic operations before this. We made an operation using a very large frontal flap which included a large part of the hairy skin of the head as well as a piece of the adjoining forehead. A small flap arising as an offshoot from the main flap served to restore the right under eyelid. Plate P 133 shows the result of the initial operation, with the nose, part of the upper lip, cheek and under lid and a small piece of the upper lid constructed from the flap. The secondary defect was already epithelialised by an « epithelial inlay », prepared before the flap was cut. Later we covered a defect in the scalp with a pedicled flap from the region of the head further back, which when healed could be hidden by brushing the hair over it.





Plates O 136-147.

Patient O.

Berlin.

See page 134.

The patient wanted a restoration of the middle and right side of the upper lip and the nose. (See Plates O 136-137.)

First a rib cartilage (as often described) was placed under the skin of the forehead (see Plates O 136-139), and afterwards an «epithelial inlay» (see enumeration of author's publications) was placed under the periost behind the cartilage. (See Plates 140-141.)

After placing the flap in the defect, the Plates Nos. 144, 145, 146 and 147 were taken. Plate 146 shows the result of the «epithelial inlay» on the bone of the forehead. As no granulations exist we obtain a clean, dry condition for the correcting operations. To correct the frontal inequalities, the epidermis remaining on the forehead from the «epithelial inlay» can be cut away at once if not too large, and the borders can be sewn together. If too large, it can be done in two operations. The first time, the breadth is diminished by cutting away an oval piece at each side. The wound borders formed by the rest of the «epithelial inlay» on the forehead, are not strong enough to resist the tension necessary to close the wounds, so it is better to approach the real skin borders by long stitches which pass over the remaining middle part until the wounds are closed.

Some months later, as the skin has been stretched and lengthened completely, the rest of the «epithelial inlay» can be cut away, and the borders brought close to each other, taking care that the edges of the wound turn outwards and not inwards, in order to get the retracted scar on the level of the skin surface.

On the Plates O 142-143 the division of the flap into one part for the nose and another for the lip is made, but we shall chiefly show in this book how to bring the material into place, and not enter into descriptions of the corrective operations.

D. Eyelid Flaps

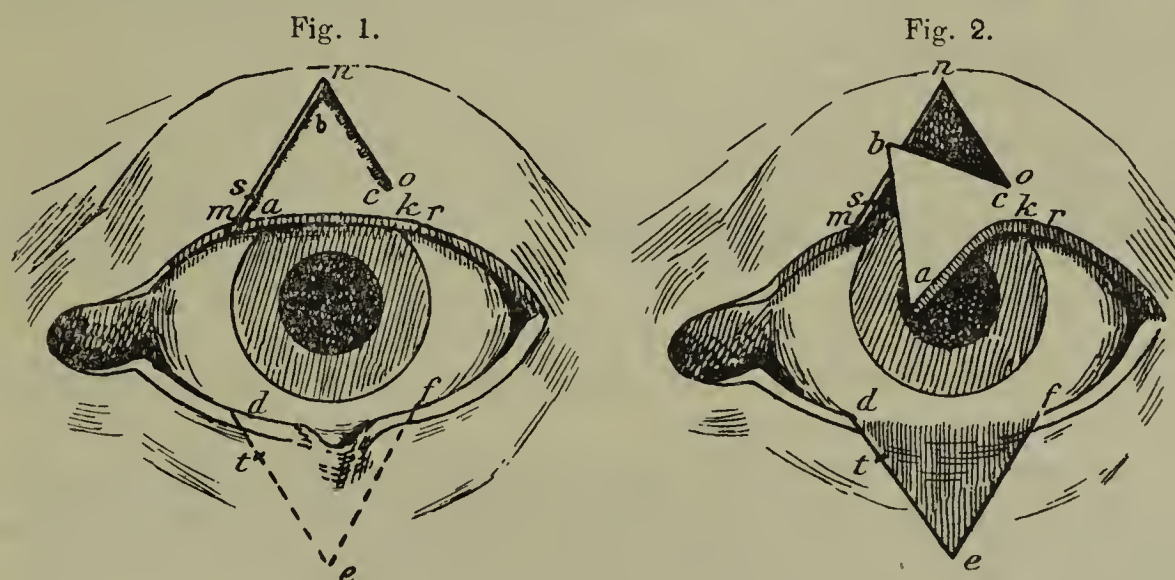
In mutilations caused by the war, the upper eyelid alone was seldom damaged. It is probable that most shots that would touch it would prove fatal, owing to the nearness of the brain.

The lower lid, however, was often involved in damage done to the face in general, and this was frequent, for in trench warfare the face would be the most vulnerable part of the body. The upper lid, however, had often to deal with an increased supply of lymph and would frequently be in a state of stase. This oedema, similar to elephantiasis, often resulted in a considerable increase in the size of the lid. This fact could actually be made of use, and we were often able to repair a lower lid from the surplus of an upper lid. This is of great value, for the border of the eyelid is very difficult to reproduce, and nothing serves so well as a piece which can be spared from another lid, particularly for the middle of the eye, for the cornea is very sensitive and suffers from friction caused by the introduction of foreign tissues.

In different cases where a part of an upper eyelid can be used to repair a defect in the lower lid, we made use of the fact that a small artery with its accompanying vein runs along the border of the lid, and we were thus able to bring into practice the principle of biological- or artery flaps.

The flap is taken from the upper lid and is triangular in shape with the apex uppermost and the border of the eyelid for its base. It involves the breadth of the eyelid in height and the whole of its thickness and about a third of the length of the eyelid border may be taken, usually from the middle region. A very short, fine pedicle, about 2 mm. long attaches the triangle to the rest of the eyelid and is situated at the lower and outer angle of the triangle. In addition to the blood vessels the pedicle contains a certain amount of protective tissue and a short length of the stiff eyelid border. The presence of the latter in the pedicle is not ideal, but the vessels are so fine and so closely associated with it, that its removal would cause too great a risk of damage to them. In practice we did not meet with a single case of necrosis of the flap, after it was turned through nearly 180°. In theory it should be turned through

180°, but in practice, owing to the elasticity of the eyelid border, the flap tends to straighten itself again, so that, even when sutured in its new position, it takes up a position at an angle something less than this. In cases where the flap is to be received by and sutured to another flap, already brought to the region, the tissues of this other flap should be chosen with a view to their future function as parts of an eyelid and they should be as elastic as possible. With the assistance of such other flaps any part up to the whole of an eyelid can be repaired. The new lid need not be as large as the original one, especially as the upper lid with the flap removed is also reduced in size. If the border of the new under eyelid is comparatively short, the tendency will be for the border of the flap to lie horizontally during the healing period, for its own elasticity will not be able to come so much into play. During the healing period the eye, if present, will have a small oval at its outer part uncovered. In the accompanying diagrams, see page 120. Fig. 1 shows the flap cut but not turned.



a b c represents the flap ;

m n o represents the edges left after cutting the flap ;

d e f represents the triangle cut to receive a b c ;

ck / or represents the pedicle.

Fig. 2 shows the flap being turned to take up its new position : The

point b comes to e, c comes to d and a to f. The small portions of the wound marked d-t and m-s remain free for the time being.

After the flap has healed (3-6 weeks) the pedicle is cut and the remaining edges are joined : m with r, s with o, p with d, and t with c. In order that these sutures may be made so that no projections nor inequalities arise it is necessary to « freshen » the wounds m-s and d-t, which had been cut at the cutting of the flap some weeks previously. To prevent granulation of these wounds we sometimes sew these edges to the inner borders of the loose tissue of the opposite wounds (m to o et d to c) and in this case these have to be cut free before sewing them to the cut pedicle borders, this also keeps the flap in position better.

After the cutting of the pedicle and the sewing together of the wounds, the eyelid borders both take up a normal position. During the healing period the uncovered portion of the eye must be protected, by treating it with vaseline or covering it with a glass, to keep it moist and to prevent keratitis e lagophthalmo. We have made several operations of this type. (See *Klinische Monatsblätter für Augenheilkunde*. 1919. LXIII. Band. September.)

Plates L 1-2 and before.

Patient L.

Berlin. Ophthalmological Clinic.

See page 113.

The patient showed a severe case of destruction of the greater part of her left cheek by lupus scars.

The enormous ectropion, which had been operated on differently by others without result, was healed at once and completely with an eyelid flap, taken from the upper lid, as is demonstrated on the accompanying drawing. The result was perfect.

ISLAND FLAPS

These flaps contain a skin island taken from the middle of the cheek and are fed and cleansed by the facial vein, artery and lymph-vessels.

I use them already since twenty years and showed and described them often many years before, in English language, in 1917 in *Annals of Surgery* and in *Surgery, Gynecology and Obstetrics*.

The uppercut must go in the direction of the facial nerve and lay beneath the ductus stenonianus, or if above, it must be continued obliquely downwards to the mouth-interior, not to hurt the Ductus.

The flaps can be used for defects of the cheek in the neighbourhood, but are especially useful for substitute mucous membrane in cases of cancer or other causes of destruction where mucous membrane has been cut away.

The lower cut, which is often less straight and more in a bow, must be the least deep possible not to hurt nerves and vessels. Its borders must be undermined and loosened, so that the upper one can be approached to the upper mucous-membrane border and the lower one to the upper cheek-skin border of the upper cut. Especially these island flaps are very movable and may be large if the people are rather old and the cheek is weak and flabby and we just often need them for old feeble and thin cancer patients.

The result is also very satisfactory in an esthetical point of view as the cheek after the operation is more stiff and stretched, like it was in the youth of the patients. The operated side looks much younger, so that ladies now and then asked to have stretched their other cheek. This can be done easier from a cut at other places, but it would go beyond the borders of this book to describe those corrections here.

The three accompanying plates show an example, which gives nearly equal upper and lower cuts, but I declared that usually the uppercut is more straight, especially if the flap is to be used for restitution of the innermouth.

The first plate shows the skin island and the projection of the Ductus stenonianus. At the second plate the uppercut is continued till perforating in the mouth. On the third plate the skin island is already half turned inwards, so that its upper border can be sewn to the under border of the mucous membrane-defect in the mouth. This has to be done from the inside through the mouth. Afterwards the lower border of the skin island is sewn to the upper border of the mucous membrane-defect. The lower border of the skin island is loosened the least possible. Also the curved parts of the upper cut near the corners. The sewing occurs in tension and the mucous border is torn outwards, but diminishes afterwards as the skin-wounds are shut.

These skin-wounds are the surroundings of the defect, caused by the disappearance of the skin island.

In using these «Island flaps» the greatest care has to be taken to keep all the above mentioned vessels intact. The flaps have to be real biological flaps and all particular advice must be followed, which those biological flaps demand.

The name «Island flaps» is only practical, but it may not be forgotten that cheek «Island flaps» are only of value if they are well cleansed and nourished as the principles of biological flaps require. In that case they can withstand the first tension, which diminishes gradually.

E. Angular Flaps.

GENERAL OBSERVATIONS AND TECHNIQUE.

The angular artery is the continuation of the facial artery from the edge of the mouth upwards to the inner edge of the eyebrow, above which it is the frontal artery. It ascends outside the naso labial groove, always lying deep, and flaps taken with this artery consequently contain more than the usual amount of muscle and connective tissue. For the same reason the pedicle is more voluminous than usual, for as it is never quite certain within a few millimetres where the vessels lie, a strip of tissue about the size of the little finger is taken to make sure of including the vessels and to avoid damaging them. This inclusion in the pedicle of a considerable quantity of muscle and connective tissue, though contrary to my usual practice, in this case does not involve a great risk of constricting the vessels in the turned pedicle, because the tissues included are very frail and pliable.

The angular flap is usually taken from the inner part of the cheek up to the nose. The secondary defect can very readily be closed by suturing as the cheek tissue is very elastic and mobile, and as the deeper tissues are removed owing to the depth at which the artery lies, it is easy to bring the skin together on the surface of the defect. The line of the cicatrice is never very evident as it always lies above the line which separates the nose from the cheek, and when the flap extends to the mouth the cicatrice coincides exactly with the normal naso labial groove.

We have used these flaps for many different purposes, such as restorations of parts of the nose, parts of the whole of the upper lip (including harelip) and of the underlip, restorations of the mucous membrane of the mouth (palate, cheek, jaws and tongue), and accounts of these operations are published elsewhere. (See Enumeration of publications of Dr. Esser.)

In cases of harelip where it is necessary to bring material to the upper lip, angular flaps may be very successfully employed. A short flap may be brought to lie horizontally under the nose, and if the flap is taken longer, it may be brought first horizontally under the nose and then turned vertically downward in the middle line of the upperlip till the distant end reaches the border of the lip. The mistake in many cases of harelip restorations is, that as a rule the lip is not large and broad enough and instead of curving outwards and upwards, as an ordinary lip, it curves inwards, which marked ectropion that can be recognised at a long distance as a repaired harelip. This is a more serious matter than it might at first appear. We have studied very carefully the psychological effect of harelip on children suffering from it and we found that without exception it was a sense of not being quite complete and normal that depressed them, much more than the mere fact of being ugly. Children have frequently admitted to us that they were nicknamed «harelip» by other children, who do not feel or comprehend how deeply a child mutilated from birth would feel the shame of such taunts. Paying attention to this circumstance our first objet in repairing harelip is always to get definitely rid of the harelip type in the first operation, even if necessary at the sacrifice of beauty in the ultimate result, and we are convinced that in so doing we are producing the happiest results in the minds of the children as well as in those of the mothers. A mother will suffer a great deal more having a harelipped child than one who has a lip mutilated by an accident, because, though innocent, she feels herself in some sense guilty for the suffering of the child. For the same reason we try wherever possible to alter at the same time the form of the nose, if it has the flat broad unmistakable character of the harelip nose, when the alae are often asymmetrical and concave instead of convex. We have already published accounts of some of the cases of harelip that we have treated by means of angular flaps. (See *Typische Herbeiführung vom Material bei einseitigen und doppelseitigen Hasen Sharten. Archiv für klinische chirurgie. Bd. 112. Heft 1.*)

In many cases where it has been necessary to restore by means of angular flaps the nose, partially or completely, the cheeks or the under eyelid, we have found it more practical to use flaps with the pedicle at the top instead of at the bottom. We have called these *upper pedicled flaps*. It is, of course, obvious that the conditions in such flaps were less favourable than in the ordinary pedicled flap, as the circulation, after the base of the vessels has been cut through, has to take place in the opposite direction, and the artery filled with blood from its connections and branches with other arteries and similarly the veins. This new circulation is at first very slow. The usefulness of making these upper pedicled flaps lies in the fact that by having the pedicle above instead of below, use can be made of the flesh of the lower cheek up to the border of the lower jaw, where this flesh is easily spared, and the defect made by removing it, is very easily repaired by simple suturing, the scar being very slightly noticeable as it lies in the naso-labial groove. Diagr. pl. 172. S.p. 159 illustrates some methods of using upper pedicled flaps. In plate 172 a, I is the primary defect, and II is the place where the flap is to be taken from (later the secondary defect). In Plate 172 b, I is shut by a flap from II, and II is to be sutured in the line of the naso-labial groove and its continuation. In Plate 173 a, I is primary (nasal) defect and II is the place where the flap is taken from, 173 b, I is shut by a flap from II and II is to be sutured in the line of the naso-labial groove.

We do not give here many cases of restorations of defects by means of angular flaps, only sufficient to illustrate the principle. An article on the use of angular flaps for the restoration of the upper lip was published by us in 1919. (Bruns Beiträge zur Klinische Chirurgie, Band CXVI, Heft 2 No 71. Kriegschirurgisches Heft, Kriegschirurgisches Band XV, Heft 2, Page 335 : « Arteria Angularis Lappen für Oberlippen und deren Defekte » :)

CASES OF ANGULAR FLAPS.

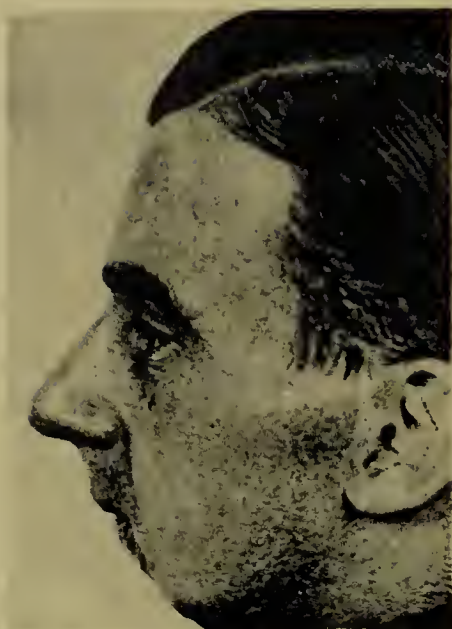
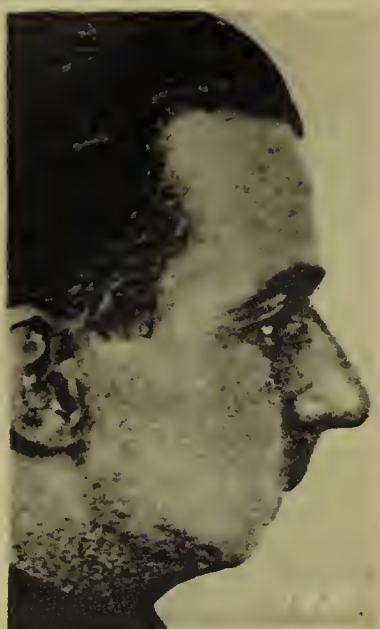
a) REGULAR CASES.

1. *Restorations of chin and under lip.**Plates L 1-5.**Patient L.*

Berlin. Clinic Bier.

See page 145.

Patient L had been severely mutilated by shrapnel, and had lost the whole lower jaw and most of the tongue. From each cheek a large angular flap was cut, 10 cms. long and $4\frac{1}{2}$ cms. wide, extending as far up as the inner edge of the eyebrow where it terminated in a small angle. Such broad flaps can only be cut when very long, so that the tension caused by sewing the edges of the secondary defect together can be spread over a long line. It is better when such a broad flap is required to take one from each side to insure symmetry. In the present case the flaps were brought into a position to form a new chin and arranged, so that the tip of each flap reached to the base of the other, and the two borders joined, so that the borders of the resulting combined flap were nearly parallel. The free border of the upper flap formed the lip edge and that of the under flap was joined to the skin which surrounded the defect. This skin had to be first of all freed by a cut to a suitable shape to receive the flap. The mucous membrane for the new lip was taken from the existing mucous membrane of the mouth. This mucous membrane should be taken from the nearest place from which it can most easily be spared, and the part of the flap intended as the lining of the lip itself should be as thick as possible and should contain sufficient muscle tissue to fill the new lip as natural in appearance as possible. Muscle tissue giving the new lip the power of movement is supplied also from the angular flap and the innervation remains intact. The appearance of the patient after this simple and economical operation was wonderfully improved and the expression of the face and the movement of the new under lip were quite natural. (See Plates L 3, 4 and 5.) The scars caused by the operation were hardly noticeable.



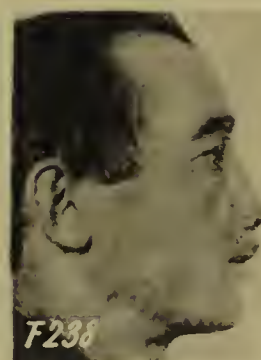
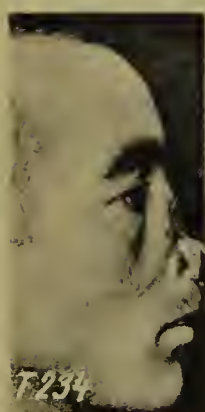
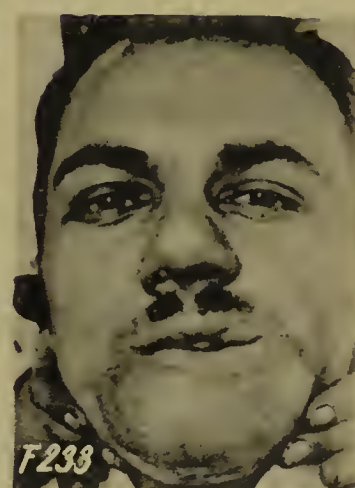
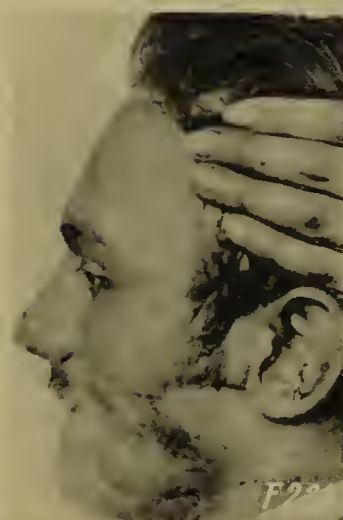
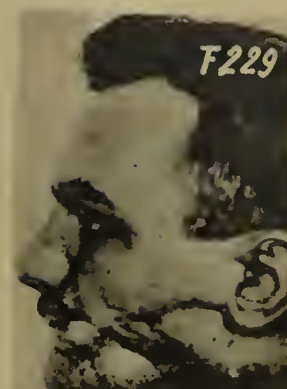
T225

T227

H95

H96

H97



Plates T 221-227.

Patient T.

See page 147.

Patient T had lost the chin and middle part of the lower jaw. Scar tissue covered the region of the lost parts. (See Plates T 221-223.) It was necessary in this case to bring to this region sufficient material to provide a new chin and with a good circulation, that would assist a graft of bone to take the place of the destroyed jaw bones.

Plates T 224-227 show how this was done, by using a small angular flap from the right side and a large one from the left. Afterwards we used a temporal flap for his chin and jawgraft. See page 45.

Plates F 226-233.

Patient F.

Berlin. Kriegslazarett Technische Hochschule.

See page 148.

Patient F had already had several operations before coming to us for the restoration of the chin and lower lip, but the resulting new lips and chin were non muscular and the mouth could not be shut sufficiently to prevent a continuous flow of saliva. The object of our operation was to provide the lips with muscular tissue to correct this. We used angular flaps as shewn in Plates 228 229. In such a case the flap must be of considerable size as it always diminishes in size later, and subsequent corrections must be made in such a manner as will retain a large proportion of muscle over skin and other tissues, so that the lip may be as muscular as possible.

Operations of this type show very clearly the value of the muscular function in angular flaps.

2. RESTORATION OF UPPER LIP.

Patient A.

Breslau, 1917.

Patient A had the right half of the upperlip badly scarred. The

angular flap is again of use in such cases on account of its muscle contents and when « perfect » innervation is maintained, the mouth movements are after healing quite normal. In this case a flap of 4 cms. long was sufficient to correct the upper lip and its movements.

The angularis flap, for harelips.

Since the year 1914 we have been against the results of the operations performed to remedy harelips. Not directly against the methods used, but against the results, which were not satisfactory, especially from one point of view. That is, you could always recognize that the person had had a harelip previously, from the appearance of the drawn skin around the edges of the mouth, and the upperlip curving inwards unnaturally (abnormality called « Entropion ») instead of curving outwards in a natural manner. Then the tightening of the edge of the upperlip draws together the corners of the mouth, with the result that the protruding of the lower lip (called « Ectropion ») is more pronounced. And the Ectropion of the lower lip emphasises still more the Entropion of the upper lip.

Thus, even after having undergone an operation to remedy the harelip, the patient mostly carries a disfiguring mark all through life, showing to all that he was born with a harelip. This naturally gives him a sense of inferiority in the presence of others, which is very demoralizing. He even prefers to have the harelip operated on less beautifully, leaving no mark and reminder of the old harelip, in preference to the most beautiful operation, that leaves the mark of having had a harelip.

Since 1914 we have used our every effort to make it clear to the medical Faculties that the principal and most important point of the harelip operations was to take away every reminder that there had been a harelip, and that it had not to leave that drawn look, so noticeable after the operation.

At the same time, it was not only that there was too little flesh on the edge of the upperlip, but that too much was added to the upper part of the lip, although there was not enough room for the quantity of flesh added. This superabundance of flesh puffs out between the edge of the lip and the base of the nose, making the Entropion still more pronounced.

The principal point is that there should not be too much flesh under the nostrils, but in abundance on the edge of the lip, which makes curve out the red of the lip.

In our publications in 1916 «Prinzipien bei einfachen plast. Operationen des Gesichtes bei Kriegsverletzten mit Ersatz des Defektes aus unmittelbarer Wundnähe» and «Mundlippen-Plastik aus der Nasolabial Gegend», and, further on, numbers 12, 13, 19, 40, 49 (see page 144 and following pp.) we have developed this principle.

We have observed in the last few years that our point of view has been taken up by many well-known surgeons, who have often omitted to give our name, and seemed to try to make it understood that the original idea was their own.

This principle of bringing the flesh to its proper place can be obtained by various methods of operation.

There exist a great many different methods to remove the harelip, which proves that there is not one really superior to the others or which easily achieves a good result.

In cases which are not difficult, almost any method will give a moderate result, if is realised in what manner to employ it. It would lead the question too far, were we to explain and criticize all these different methods in our book, which is entirely dedicated to «Biological or Artery Flaps».

The angularis flap can help much in difficult cases of harelip operations, where much flesh is lacking. In many cases the use of this flap, which can bring as much flesh as can ever be needed to the lip and, if missing, especially to the bottom of the nose. The overabundance of tissue above the corner of the mouth often requires a corrective operation afterwards, to remove this superfluous tissue. The angularis flap is the only biological flap in which the pedicle always contains a quantity of tissue, because the vessels lie very far from the surface, and it would be too unsafe to make the pedicle too thin, by preparing the vessels with too little surrounding tissue.

In the corrective operation there is no fear of bad results from a slight wound of the vessels, but the remaining of the accompanying nerves is useful.

3. RESTORATIONS OF INNER MOUTH. PALATE.

*Plates 1-3.**Patient Geheimrat X.*

Berlin.

See page 155.

This patient had a hole $1\frac{1}{2}$ cms. in diameter in the middle of the hard palate, surrounded by scar tissue. In this case a large massive flap, 10 cms. long and 3 cms. wide in its largest part (see Fig. 1 a, b, c, d) is cut, with pedicle in the cheek 2 cms. away from the corner of the mouth. A perforation of the cheek is made first at the side of the mouth between A+B Fig. 1 of the pedicle and through this, the whole flap is passed, until the distant end reaches the hole in the palate, which it serves to close.

Plate 2 shows the hole in the palate and the hole between the teeth that permitted the pedicle to pass. Plate 3 shows the flap fixed on the hole.

A number of similar cases have already been described by us. (Deutsche Zeitschrift für Chirurgie. Band 147, Heft 1-2.)

*Plates A 3, A 4, A 5.**Patient Y.*

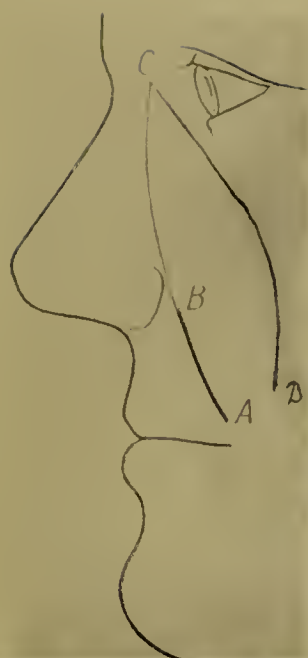
See page 155.

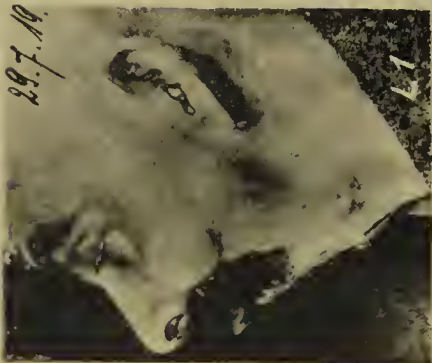
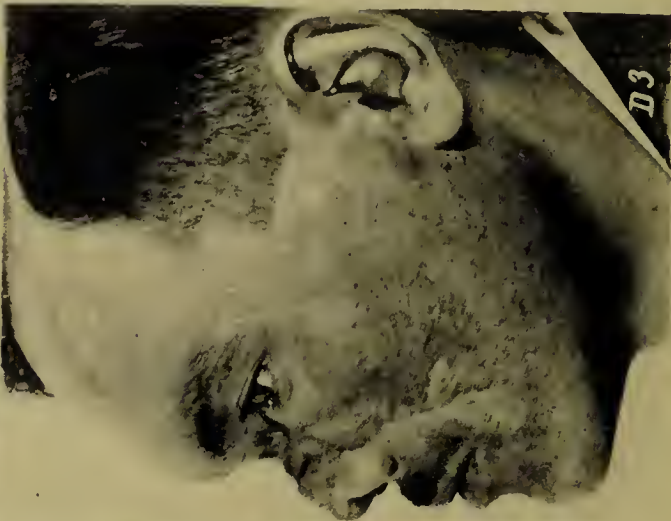
The upper left jaw was totally severed for a cancer. In this case by a very very large angular flap of 10 to 4 cms. the whole separation between nose and mouth was reconstructed. The plates 4-5 show the defect, Plate 6 the healed patient.

*Plates R 1, R 2.**Patient Z.*

See page 155.

Plates R 1, R 2 show the patient with a very large angular flap to cover a great defect of the palate. The pedicle is not yet cut. Crusts of woundsecretion cover the stitches a week after the operation. In similar cases, nearly in all facial plastics no bandages are used, only the wound is directly after the operation covered with some calomel powder.





b) UPPER PEDICLED FLAPS.

1. RESTORATION OF NOSE.

Plates D 1-4.

Patient D.

See page 156.

Patient D had lost his nose and the surrounding cheek tissue was much scarred. Parts of the alae were left but cicatrized. From both sides of the face upper pedicled flaps were taken as shown in diagram Plate 173, a + b, see page 99, that from the left being used for the lining of the nose and that from the right for the outer covering. As is shown in Plate D 2 there was a considerable surplus tissue in the flap, at the right side of the nose, and this was brought there to avoid any possibility of tension in the flap, which would impede the circulation already weakened considerably by the cutting of the vessels at their base. After the flaps had healed (see Plates D 3-4) corrections were made and cartilage grafts introduced.

Plates Z 184-187.

Patient N.

Budapest, 1917.

See page 159.

Patient N had lost the left eye, the upper part of the nose and the left under eyelid. (See Plates Z 184-185.) A simple upper pedicled angular flap forming a combination of the cases as described and illustrated in diagram Plate 172 and 173 a and b restored the defect, with the results shown in Plates Z 186-187.

Plates V 165-171.

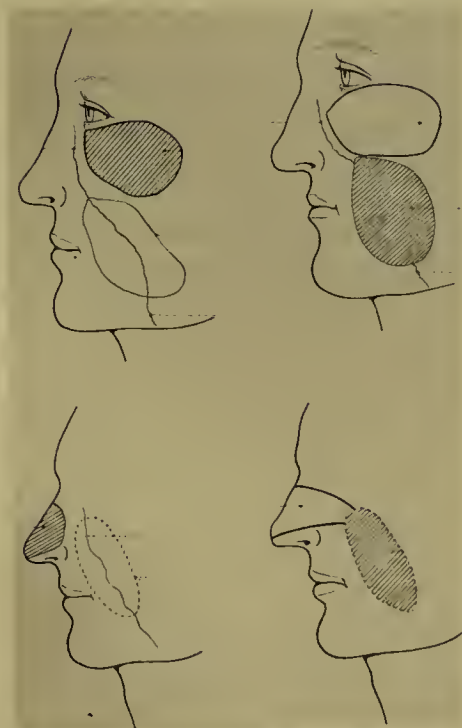
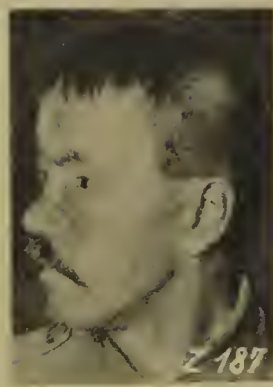
Patient F.

Berlin, 1918.

See page 159.

Patient F had lost the middle part of the nose with a shrapnel wound. (See Plates V 165-166.) Two flaps were cut as described in Plates D 1-4 above, one from the right for the inner lining of the nose and one from the left for the outer covering.

Plate 167 shows the treatment of the pedicle, which contains in this case a considerable amount of tissue. After correction and the placing of a rib cartilage graft between the two flaps a beautiful nose was formed, and the scars were later on so difficult to detect, that it was not noticeable that the patient had undergone an operation.



Plates F 234-238.

Patient F.

Berlin. Military Hospital, Tempelhof.
1922.

See page 148.

This case is a very good example of the building of a new nose with an upper pedicled angular flap. The nose was almost entirely destroyed, only a small part of the right ala and of the septum remained. (See Plate 234.) In a manner similar to that described for Plates V 165-171 above, two flaps were cut, and after their healing, corrections were made and a cartilage graft supplied, with the beautiful results shown on Plates F 237-238.

Plates H 94-97.

Patient H.

Vienna, 1915.

See page 147.

Patient H lost the under part of the nose as is shown on Plate H 94, with the exception of the left ala and the skin septum. In this case we prepared an upper pedicled angular flap with an «epithelial inlay». When the inlay was healed (after 3 weeks) the flap was cut and placed on the border of the remains of the nose at the right side, in a cut between the left ala and septum at one side and nose remains at the other. In this manner the ala and septum could be brought to their natural positions and healed there as is shown on Plates H 96-97.

2 COMPLEX RESTORATIONS.

Plates 153-160.

Patient W., German soldier.

Clinic of Geheimrat Prof. Krückmann, Berlin.

See page 100.

The blind patient W. was in the Blind Institute of Berlin and brought to us for treatment by Geheimrat Professor Silex, in 1921, and received different treatments from us.

On page 80 is described a temporalis (ramus anterior) flap for restoring his left under eyelid. Before the left upperpart of the cheeks the nose and the right under eyelid were restored by upperpedicled angularis flaps which are mentioned here and made on this patient before the temporalis flap was applied.

It is very remarkable that most blind patients have still a great interest in the beauty of their appearance, but it is observed in a great many cases.

This patient, however, did not mind so much and was in this point of view an exception. He liked to have the possibility to wear glass eyes, because the great holes, covered with conjunctiva rests, were irritated by dust and cold wheather, and if they were shut by the glass eyes, he would feel better.

In such cases the nerve ends in the cicatrized wounds are often very sensitif.

It is also remarkable that blind subjects, even if they have been provided with good eyes before, still they generally do not feel unhappy. On the contrary the deaf patients suffer ordinarily much more. Probably the blind can develop more intensely his mental occupations, following his personal love and ambition. It is also a curious circumstance, that he is especially sought after by young girls to marry, probably for two reasons : 1) a woman likes to take care of a person and the more such a person is dependent on her, the more she feels a practical result and

she occupies a very useful position and can develop all her tenderness; 2) she forms nearly the complete contact of the blind with the world, that again makes her very useful and is the means of implanting a great love on both sides.

Now returning to the case, we re-mention that the patient came under our treatment in the condition, shown on plate S 153. Both under eyelids and the upper part of the left cheek and the nose were destroyed by a shrapnel in the great war of 1914, excepting both alae, the point of the nose and a small bridge of skin from the point of the nose to the forehead, remained.

Both exceptionally large nostrils were filled up with cottonwool, because the entrance of cold air made the patient suffer.

The right upper pedicled flap, being very large, served to make the eyelid and the right side of the nose. The left upper pedicled flap could not be large enough to quite restore the mutilation of the nose, uppercheek and eyelid, but was sufficient for the nose and cheek, as can be seen on plate S 154, taken one day after the operation. The tissues and the upperlip were still swollen, the latter because the circulation remained in it, was very much diminished and had to re-establish itself.

As we do not use bandages for such patients, we only cover with calomel powder, the wound secretum mixed with the blood causes crusts.

On plate S 155 the ramus anterior temporal flap, described on page 80, is already established on the face and has only to be corrected, and to be changed into an eyelid. These corrections were not yet finished on the plates S 156-160, neither was a piece of cartilage put in the nose to lift up the nose. Besides the nostrils had to be made smaller and more natural. All these corrections were not difficult, because there was sufficient tissue for them, but we will not enter into particularities about them, as they do not belong to the « Biological- or Artery Flaps ».

164.

Plates W 172-174.

Patient W.

See page 140.

Patient W lost the under eyelid and the bone surrounding the eye on the left side and the cheek was much cicatrized, the middle of the nose was destroyed and was markedly saddle shaped and scarred.

An upper pedicled angular flap, reaching to the corner of the mouth, but not very wide, was cut and used to build up the missing underlid and to provide material to fill up the defect in the nose. A rib cartilage was grafted in the flap giving it a perfect shape, and the new under eyelid was quite normal in appearance while an artificial eye could be kept in position. (See Plate W 174.)

3. RESTORATIONS OF UNDER EYELID.

Plates J 180-183.

Patient J.

Berlin, 1920.

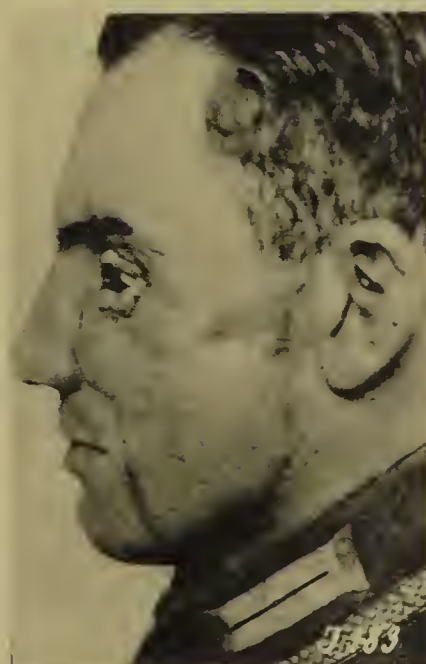
See page 165.

Patient J had suffered a still more severe mutilation, the cheek and the left eye and eyelid were missing. To repair this, a very large upper pedicled angular flap was taken, extending to the border of the lower jaw. Plate J 181 shows the scar of the secondary defect and the position of the flap in the upper part of the cheek. Plates J 182-183 show later stages with an artificial eye kept in position by the new under eyelid.

In very special cases of the restoration of the under eyelid, the defect might be closed by an upper-pedicled angular flap.

In general, it is better *not* to use an upper-pedicled flap, as it is unnatural, if a regularly pedicled flap is possible, or a «rotation of the cheek» which is nearly always possible, and preferable for such defects.

Only when the particular position of the scar tissue makes difficulties, and the operation really requires it, then an upper-pedicled flap gives the best solution.



F. OTHER BIOLOGICAL- OR ARTERY FLAPS.

Various other arteries were used for artery flaps and more and more will be used in the future.

We recommend specially the arteries intercostales and the artery epigastrica.

No particular description is given of the use of them.

The intercostales give origin to all kind of untypical flaps and combinations.

The epigastrica can be very useful for help to mutilations of the genital organ and of the frontal upperpart of the leg.

They have served us several times with great success.

Especially to heal large radium- or X-rays ulcera, these flaps are of the highest value, because flaps from the direct neighbourhood of the ulcus give a bad prognose.

We intend to publish in another book the biological flaps of the body.

ENUMERATION OF THE PUBLICATIONS
OF
Dr J. F. S. ESSER

1916

1. Ohrplastik. Wien. Klin. Woch. Nr. 15. 1916.
2. Ueber Amputations stumpf-Plastiken. Militärarzt 18. 1916.
3. Ueber Amputations stumpf-Plastiken. Wien. Med. Woch 15/7/1916.
4. Prinzipien bei einfachen plast. Operationen des Gesichtes bei Kriegsverletzten mit Ersatz des Defektes aus unmittelbarer Wundnähe. Bruns Beitr. Bd. 103 s. 519. 1916.
5. Neue Wege für chir. Plastiken durch Heranziehung der zahnärztlichen Technik (Epithel-Einlage). Bruns Beitr. Band 103 s. 547. 1916.
6. Lokale Knochen — Plastiken bei Unterkiefer-Defekten. Bruns Beitr. Bd. 105 s. 555. 1916.
7. Heilung eines aus russ. Gefangenschaft ausgetauschten Invaliden. Bruns Beitr. Bd. 105 s. 564.
8. Mundlippen-Plastik aus der Nasolabial Gegend. Bruns Beitr. Bd. 105 s. 545.
9. Verlagerung des zerschossenen Nervus radialis zwecks besserer Verheilung. Zentr. Blatt für Chir. 43 Jahrgang Nr. 49.

1917

10. Penis Plastik bei einem Kriegsverletzten. Wien. med. Woch. 17/2/1917.
The numbers 11, 12, 13 of this enumeration have been published in the form of three different chapters under the collective title « Studies in plastic surgery of the face » in Annals of Surgery, March 1917.
14. Healing of Lower Jaw Bone Defects in war cripples Amer. Journal of Surgery N. Y. Nr. 12, 1917. Page 305.
15. A Displacement Operation for Gunshot Nerve Injuries. American Journal of Surgery, Nr. 6, 1917.
16. Lengthening of the skeleton of very high Femure amputations N. Y. med. Journal.
17. Reducing in Size of the nose skeleton of war wounded soldiers with nose defects for better plast. work. N. Y. med. Journal.
18. Island flaps. N. Y. med. Journal, 186-264, 1917.
19. General Rules used in simple plastic work on austrian war-wounded soldiers. Surgery Gynecology and Obstetrics, June 1917, Nr. 24, page 737.
20. Muskelplastik bei Ptosis. Zentr. Bl. f. Chir. Nr. 39, Sept.
21. Ohrläppchen-Plastik aus dem Ohrrande. Zentr. Bl. für Chir., Nr. 35, Sept. 1917.
22. Operativer Ersatz der Mittelhand nebst 4 Fingern aus halben Fuss. Bruns Beitr., Bd. 108, Heft 2, S. 244.
23. Gestielte Plastiken bei typischen Erfrierungen und bei schlecht geheilten Amputationsstümpfen der unteren Extremitäten. Bruns Beitr., Bd. 108, Heft 4, S. 514.

24. Verschliessung von Larynx und Trachealfisteln oder Defekten mittels plastischer Operation. Archiv. für Kl. Chir., Bd. 109, Heft 2.
25. Sogenannte totale Oesophagusplastik aus Hautlappen nach Thiersch ohne Verwendung von Darmschlinge. Deutsche Zeitschr. f. Chir. Bd. 142, Heft 5, S. 403.
26. Urinblasen-Ersatz bei Ectopia vesicae. Zentr. Bl. f. Chir., Nr. 42.
27. Mundwinkelplastik. Münch. Med. Woch., Nr. 41, S. 1343.
28. Muskelplastik bei Amputationsstümpfen zwecks Steuerung und Fixierung der Prothese. Deutsche Med. Woch., Nr. 47.
29. Dura und Schädelplastik bei Gehirnprolaps mit gestieltem Periostlappen ohne Knochenlamelle. Deutsche Zeitschr. f. Chir., Bd. 142, Heft 5, S. 298.

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30. Gestielte lokale Nasen-Plastik mit zweizipfligen Lappen Deckung des sekundären Defektes vom ersten Zipfel durch den zweiten. Deutsche Zeitschr. für Chir., Bd. 143, S. 385.
31. Säuberung und Verheilung stationären Knochengeschwüre durch Deckung mit gestielten Lappen. Berl. Klin. Woch., Nr. 26.
32. Deckung von Harnblasen-Defekten. Deutsche Zeitschr. f. Chir., Bd. 147, Heft 1, S. 126.
33. Deckung von Gaumendefekten mittels gestielter Naso-Labial-Hautlappen. Deutsche Zeitschr. für Chir., Bd. 147, S. 128.

34. Eigenartige Ausnutzung einer misslungenen plast. Operation. Deutsch Med. Woch. 1918, Nr. 44.
35. Antwort an Herrn Dr. Hans Biedermann zum seinen Artikel :
« Zum Aufsatz von Esser über eigenartige Ausnutzung einer misslungenen plastischen Operation ».
36. Die Vagina als Harnblase. Deutsche Med. Woch., Nr. 52.
37. Verwendung der Mamma für Deckung von Amputationsstümpfen. Münchener Med. Woch., Nr. 43, S. 1185.
38. Schwerer Verschluss einer Brustwandperforation. Berl.Klin.Woch. Nr. 50, S. 1197.
39. Die Rotation der Wange und allgemeine Bemerkungen bei chirurgischer Gesichtsplastik. Verlag Vogel, Leipzig, 1918.
40. Ueber plastische Operationen des Gesichtes durch « Rotation der Wange ». Berliner Klinische Wochenschrift, S. 199, Jahrg. 1918.
41. Fälle von plastischen Ptoxis Operationen. Berliner Klinische Wochenschrift, Seite 588, Jahrgang 1918.
42. Plastische Operationen. Berliner Klinische Wochenschrift, S. 728, Jahrgang 1918.
43. Nasenplastik. Berliner Klinische Wochenschrift, Seite 1243, Jahrgang 1918.
44. Gesichtsplastiken mit schmalgestielten « Arterien-Hautlappen ». Berliner Klinische Wochenschrift, Seite 1247, Jahrgang 1918.

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45. Gesichtsplastik. Berliner Klinische Wochenschrift, Seite 22-23, Jahrgang 1919.

46. Arteria-angularis-Lappen für Oberlippenbau und deren Defekte. Bruns Beitr., Bd. 116, Heft 2, S. 335.
47. Plastische Deckung von Defekten durch sogenannte Einnähung. Deutsche Zeitschr. für Chir., Bd. 148, S. 385.
48. Zilienplastik. Deutsche Zeitschr. für Chir., Bd. 148, S. 199.
49. Eine Sehnenplastik unter sehr unsauberen Verhältnissen. Münchener Med. Woch., Nr. 7, S. 184.
50. Verwendung der Mamma bei Handplastik. Zentr. bl. für Chir., Nr. 1.
51. Deckung von Amputationsstümpfen des Oberschenkels aus dem Arm bei beiderseitig Amputierten durch Einnähung. Zentr. bl. f. Chir., Nr. 2.
52. Herstellung von behaarten Augenlidrändern. Klin. Monats. blätter für Augenheilkunde, Bd. 62, Febr.
53. Epithel-Einlage als konjunktivaler Ersatz. Klin. Mon. blätter für Augenheilkunde, Bd. 63, Sept.
54. Ueber eine gestielte Ueberpflanzung eines senkrecht angelegten Keils aus dem oberen Augenlid in das gleichseitige Unterlid oder umgekehrt. Klin. Monatsbl. für Augenheilkunde, Bd. 63, Sept.
55. Typische Herbeiführung von Material bei einseitigen und doppel-seitigen Hasenscharten. Arch. f. Chir. Klin., Bd. 112, Heft 1.
56. Verwendung der Mamma für Deckung von Amputationsstümpfen. Zeitschr. für ärztl. Fortbildung, Nr. 1, 1919.

- 57. Verstellung von Canthus. Arch. f. Klin. Chir., Bd. 115, Heft 3.
- 58. Nasenbildung aus der Oberlippe. Zentr. bl. f. Chir., Nr. 47.
- 59. Unterstützung und Hebung des Bulbus durch frei Transplantation von Rippenknorpel. Zentr. bl. f. Chir., Nr. 46.
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- 61. Plastische Operationen mit einem Fall von Transplantation eines fremden Ohrteils mit teilweisem Erfolg. Berliner Klinische Wochenschrift, Seite 189, Jahrgang 1920.

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- 64. Schusterspanverbände bei Gesichtsplastiken. Arch. f. Klin. Chir., Bd. 117, Heft 3, S. 438. 1921.
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- 66. Oben gestielter Arteria-angularis-Lappen ohne Hautstiel. Arch. f. Klin. Chir., Bd. 117, Heft 3, Dez. 1921.

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- 67. Ueber struktive Chirurgie (Aus einer im Kaiserin-Friedrich-Haus in Berlin für das Aertzte-Fortbildungswesen gehaltenen Vortragsreihe.) Münchener medizinischen Wochenschrift, 1922, Nr. 14, S. 502 u. 503.

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- 69. Die Rotation der Wange. Münchener medizinischen Wochenschr. 1922, Nr. 21, S. 699-700.
- 70. Schnittführungen in der struktiven Chirurgie. Münchener medizin. Wochenschrift 1922, Nr. 22, S. 818-819.
- 71. Hautbeschaffung aus Mamma und Präputium u. s. w. Münchener med. Wochenschrift 1922, Nr. 24, S. 888.

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- 72. Ueber Arterienlappen, Epithel-Einlagen, verschliessbaren Anus praeternaturalis und Reserveknorpel in der structiven Chirurgie. Medizinische Klinik, 1922, n° 25.
- 73. «Arterien Lappen». Berliner Klinische Wochenschrift, 1922, Seite 703.

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- 74. «Künstlicher After». Berliner Klinische Wochenschrift, 1923, Seite 100.
- 75. Unterbau in der struktiven Chirurgie. Münchener med. Wochenschrift 1922, Nr. 26, S. 966-967.
- 76. Metalleinlagen und Schusterspanverbände. Munch. med. Wochenschrift 1922, Nr. 31, S. 1154-1155.
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- 78. Ueber neue Prinzipien bei chirurgischer Plastik. Arch. für. Klin. Chir., Bd. 121, Kongressbericht, 1922.

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81. Operativer Ersatz der Ohrdefekte durch « Epithel Einlage » von Esser und Aufricht. — *Archiv für Klinische Chirurgie*, 1922.

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83. Procédés nouveaux de chirurgie plastique. Extrait des Bulletins et Mémoires de la Soc. des Chirurgiens de Paris, séance du 18-6-26.
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1932

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1933

87. Biologischer Hautlappen für Schwere Körpernarben. *Zentr. bl. f. Chir.*, n° 28.
88. Cheek Rotation. *Revue de Chir. Plast.*, Bruxelles.
89. Frontal Flaps. *Revue de Chir. Plast.*, Bruxelles.
90. Eyelid Flaps. *Revue de Chir. Plast.*, Bruxelles.
91. Enumeration Litteratur of J. F. S. Esser. *Revue de Chir. Plast.*, Bruxelles.
92. Biological- or Artery Flaps, General Observations and Technique. *Revue de Chir. Plast.*, Bruxelles.

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Institut Esser de Chirurgie Structive

EXPOSE D'UN INSTITUT INTERNATIONAL INDEPENDANT DE CHIRURGIE STRUCTIVE du Dr. J. F. S. ESSER.

Le docteur Esser veut se consacrer tout entier à la formation d'un Institut International pour traiter les mutilés du monde entier, les riches comme les pauvres. Les revenus procurés par les riches serviront à payer les opérations des pauvres et leur voyage à l'Institut. On rassemblera les cas de mutilations dus à la naissance, à la maladie et aux accidents.

Lorsque le docteur Esser eut constitué en France un institut qui avait à sa disposition un très grand château avec domaine, sous la Présidence d'une princesse royale, il comprit, avant d'ouvrir cet institut aux mutilés, qu'il était nécessaire de constituer un autre institut, qui serait exterritorial et tout à fait indépendant de chaque état.

Cette indépendance absolue lui semble nécessaire pour plusieurs raisons :

1) Les lois existant dans tous les pays se basent sur l'égoïsme, la politique, etc., et ne sont pas en harmonie avec le but humanitaire et scientifique et pour ainsi dire aspirant à une sorte de communisme purement idéaliste, que le docteur Esser exige. Les lois spéciales de cet Institut doivent, entre autres, permettre à tous les chirurgiens du monde d'y opérer.

2) La durée de cet Institut doit être éternelle et survivre à la vie du fondateur. Pour rendre cela possible, il faut commencer par en éloigner toute politique. Dans un état existant, des personnes profitant d'un pouvoir politique pourraient se procurer une place dirigeante dans l'Institut, quoique n'ayant pas les qualités supérieures exigées pour cette place. Cet état idéal doit être gouverné par un Conseil des plus grands savants et spécialistes du monde entier, et qui devra choisir son président ou son chef.

3) Comme tous les spécialistes les plus réputés du monde seront invités à devenir membres de l'Institut, celui-ci sera le plus compétent dans la chirurgie plastique, et on pourra exiger des riches un tarif assez élevé pour couvrir tous les frais résultant des traitements donnés aux pauvres, et du développement progressif et nécessaire de l'Institut. Les fonds pour construire et installer les bâtiments, etc., sont disponibles.

Les grandes mutilations des pauvres exigeront surtout des traite-

ments qui pourront durer des années, et comme ces mutilés ne sont pas malades, ils doivent travailler dans l'intérêt de l'institut, mais surtout dans leur propre intérêt, et apprendre le métier le plus en rapport avec leurs aptitudes. Ayant vécu loin de toute société, parce que repoussé par elle, ou l'ayant fuie par honte de leurs tares physiques, ils n'ont ni le goût du travail ni le bonheur qui en résulte.

Le but de l'Institut réside autant dans l'opération que dans la rééducation des mutilés. Il faudra d'immenses terrains pour occuper tous ces gens à l'agriculture, à l'élevage, etc., ainsi que de grands parcs, des bois, des terrains de sports, pour leur rendre la vie agréable. Il devra également être possible à quelques-uns de s'y établir définitivement avec leur famille. Il y sera adjoint un bureau de placement pour les sortants. Pour ne pas être handicapé dans le développement de ces projets par des influences politiques et égoïstes venant de l'extérieur, l'Institut devra être complètement neutre et indépendant. Tous les mauvais côtés du nationalisme ou du communisme devront être éliminés. Tout élément s'opposant à ces principes sera expulsé.

4) Pour protéger les finances et les propriétés de l'Institut contre toute attaque (impôts directs ou indirects, lois, droits de douane, etc.) ayant en vue souvent des buts politiques, et l'appui des chômeurs, qui semblent nécessaires dans chaque autre état, mais qui ne sont pas en harmonie avec le caractère de l'Institut, l'entière indépendance de celui-ci est nécessaire.

5) Dans l'Institut, il ne sera perçu aucun impôt. Aucun état n'aura le pouvoir de détruire ce règlement.

6) Pour que l'existence de l'Institut soit illimitée, aucun état ne devra pouvoir intervenir par des lois dans le fonctionnement de celui-ci.

L'état qui mettra de vastes terrains et une entière indépendance à la disposition de cet Institut se créera par là même une notoriété et la reconnaissance de l'humanité entière pour l'éternité. Cet état profitera aussi au point de vue matériel du voisinage de l'Institut :

a) livraison de tous genres ;

b) transport des personnes et des marchandises, circulation des étrangers ;

c) possibilité d'un traitement immédiat et gratuit pour tous ses mutilés pauvres, en temps de paix ou de guerre ;

d) proximité d'un centre scientifique très actif, et facilités d'en profiter en y envoyant ses étudiants ;

e) moyens de communications postales ou de personnes, par voie aérienne ou autre ;

f) diminution du chômage dans ce pays par l'emploi que fera, au début, l'Institut de ses ouvriers et matériaux, pour la construction des bâtiments, avions, etc., ce pays, pouvant, grâce à sa proximité, concourir avec le plus de chances de succès.

ELI ESSER.

Institut Esser de Chirurgie Structive

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